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TREATMENT OF MENTAL ILLNESS AT HOME BY SMALL DOSES OF INSULIN

A Follow-up Report and Appraisal of Results in Twenty-Six Cases

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THE belief that treatment of mental illness requires a hospital setting is no longer uniformly accepted. The extramural approach has been strengthened substantially by an increasing number of favorable reports.

Electroshock therapy, formerly used only in hospitalized patients, has been used successfully in ambulatory patients.[1-6] Today it is possible, in many cases, to administer this type of treatment outside the hospital, thus obviating loss of time and any stigma connected with hospitalization in a mental institution. However, such a procedure is recommended only in carefully selected cases and with adequate safeguards.

Insulin-coma therapy as a potent therapeutic agent in schizophrenia has been recognized.[7, 8] This treatment is drastic, however, and usually requires a hospital setting for proper administration.

There is a large group of patients who do not require hospitalization and whose mental condition lends itself to insulin sub-shock treatment carried out in the patient's home. Personal results with this latter form of therapy have been reported in a previous presentation,[9] which contained short-term data in 12 cases treated with this method. The treatment has subsequently been continued, and the number of cases now totals 26. The purpose of this paper is to present a follow-up report of the previous cases and our clinical observations on the cases subsequently treated by insulin sub-shock in the home.

The use of modified insulin-coma therapy as a method of management in mental disorders was long overshadowed by the more drastic therapies and received scant attention and application.

The first reference to the therapeutic use of mild hypoglycemic shock was that of Cowe.[10] In a previous paper,[9] the important pertinent literature was summarized. There have been other workers who have directed attention to the value of sub-coma insulin.[11-18] In an evaluation of the "shock" therapies in 1945 Bennett[19] mentioned the value of sub-coma doses of insulin as a method of sedation, to control the patient's anxiety and excitement and to permit a better psychotherapeutic approach. Rennie[20] carried out the insulin sub-shock method of treatment on a group of 28 heterogeneous patients and described striking results with marked clinical improvement in 19 cases. Dramatic relief was achieved with insulin in excitement whenever anxiety prevailed. Rennie found that insulin sedation was superior to sedation by ordinary chemical methods. Insulin therapy permitted a marked degree of relaxation, enabled the patients to discuss their preoccupations and provided a real opportunity to utilize psychotherapy.

Kalinowsky and Hoch[21] observed that patients with anxiety states were more amenable to psychotherapy when treated with sub-coma doses of insulin. Disturbances in the autonomic nervous system quieted down under insulin; the patient had a better appetite, slept better and gained in weight.

Beneficial results with sub-coma insulin have been reported in the treatment of acute alcoholism.[22, 23]

Hohman and Kline[24] used insulin sub-coma on 37 patients with anxiety states, depression and psychosomatic disturbances. The results indicated that this method of therapy was valuable, effective and safe in a variety of anxiety states, particularly those arising in the military service in men with combat experiences. Almost all the patients treated showed some degree of improvement, and many of the responses were dramatic.

Kelley and Thompson[25] also described favorable results in a report in 5000 patients treated by the method described by Sargant and Slater.[26]

Sullivan,[27] summarizing his experiences in 393 cases (324 psychoses and 69 psychoneuroses), concluded that intensive sub-shock therapy was of value in all relatively acute psychoses with schizophrenic symptoms. Rapid clinical improvement was achieved in the psychoneurotic patients. These studies indicated that all patients with psychoneurotic states of the severe anxiety-tension type, all psychoses with schizophrenic symptoms, psychoses with feelings of depression and psychoses of mixed type

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should receive intensive insulin sub-shock therapy. Noyes[28] and Smith and Branch[29] agree in essence with this view and point out that sub-coma doses of insulin are useful as a means of sedation to control anxiety, to improve physical health and to make a more favorable psychotherapeutic approach possible.

Psychotherapy has generally been employed as a routine procedure in conjunction with sub-coma insulin therapy for its important value in consolidating the clinical gains and maintaining improvement. A number of published reports have described the effective use of combinations of therapies. Among these is the work of Gottesfeld and Novaes,[15] who described gain in weight in 2 cases of anorexia nervosa treated with sub-shock insulin and narcoanalysis.

Stratton et al.[17] reported 60 consecutive cases in which the treatment featured psychotherapy as facilitated by combined sub-coma insulin and pentothal narcosis. The results were as follows: good recovery in 63 per cent, fair in 23 per cent, mild in 10 per cent and poor in 3 per cent.

In 1944 Weil and Moriarty[13] explored the therapeutic possibilities of a course of insulin treatment in a group of 20 patients with schizophrenic reaction types who had responded poorly to electroshock treatment alone. Insulin was administered either according to Sakel's method or with sub-coma doses. Fifty per cent of these patients responded promptly to insulin. (Sub-shock doses of insulin produced satisfactory results in 4 of the present series of cases.) In 4 patients the authors tried a second course of electric shock after a rest period, with disappointing results.

In a more recent study Polatin and Spotnitz[30] attempted to determine whether rapid clinical improvement achieved with electroconvulsive therapy in schizophrenia could be maintained or enhanced by supplementary sub-coma insulin treatment. Thirty female patients with schizophrenia were treated with this procedure over a period ranging from ten to forty-two weeks. Improvement was noted in 80 per cent of the patients treated by this method over a period of thirteen weeks. It was generally found that best results were achieved if insulin treatment was employed after the sixth electric shock. After the sixth electroconvulsion, the two therapies were administered concurrently, electroshock treatment being given three times weekly. The authors believed that this method combined the rapid beneficial effects of electroshocks with the slowly cumulative favorable effects of mild daily hypoglycemic shocks.

Sullivan[27] utilized the combined therapeutic approach but reversed the procedure. A group of patients with hebephrenic schizophrenia, manic states and atypical depressive states with elements of schizophrenia who failed to benefit from insulin therapy were subsequently given a course of electroshock treatments. The patients with manic states responded fairly well to subsequent electroshock. According to the author this method increases the over-all rate of improvement and remission to 90 per cent in patients with psychoses who do not respond satisfactorily to intensive insulin sub-shock therapy. He found that when electroshock was administered before insulin therapy, the patients who showed symptoms of depression and schizophrenia usually lost the symptoms of depression but retained those of schizophrenia. Since the schizophrenic symptoms are considered more malignant, the importance of relieving these symptoms as soon as possible was pointed out; any remaining significant degree of depression could be treated with electroshock.

Management and Technic

The treatment[20, 21, 24, 27, 30] should be carried out by a physician who has had training in neuropsychiatry as well as the shock technics. The initial handling of the patient's fears is frequently a project in itself, and psychotherapy is utilized in helping him accept the treatment. The attitude of the patient does not materially lessen the effectiveness of insulin sub-shock therapy, but lack of co-operation tends to create an awkward situation and is a definite drawback should subsequent psychotherapy be required. The physician should obtain the written consent of the patient's family before proceeding with the treatment.

Each patient to be treated is given a preliminary physical survey. This includes a general physical and neurologic examination, a roentgenologic study of the chest and an electrocardiogram. In addition to a carefully taken history and examination of the mental status, a urinalysis and blood chemical studies are done prior to treatment. Contraindications include metabolic disturbances, acute and chronic liver and kidney disease, active pulmonary tuberculosis and myocardial damage. Age alone should not be a reason for withholding this form of therapy. As a rule, a patient in relatively good health is suitable for treatment, since the physical risks with the sub-coma insulin method are usually minimal. In view of the possibility of complications, the physician must be in attendance and must observe the patient closely during the entire period of active treatment. Moreover, the physician should be easy of access for the remainder of the day in the event that the hypoglycemic state returns.

The possibility of hypersensitivity to insulin should not be overlooked. The occurrence of erythema, edema, pruritus, urticaria, tachycardia, nausea and vomiting has been described in persons treated with insulin. Insulin sub-shock as a method of management has been relatively free of complications, although such untoward insulin effects as convulsions were described in 35 out of 332 cases

by Sullivan,[27] who reported a fatal case in a twenty-two-year-old soldier in excellent physical condition, who had been acutely psychotic for about three months. On the fifth day of treatment he suddenly went into full shock about twenty minutes after receiving a dose of 60 units. He died three days later without regaining consciousness.[27] Deaths resulting from the use of small doses of insulin were also described in sub-shock treatment of a case of schizophrenia and in tonic treatment of a case of delirium tremens.[31] The clinical and patho-anatomic features in these two cases were identical with those observed in fatal complications of ordinary insulin shock therapy.

Insulin sub-coma is similar to the first phase of insulin shock treatment. The basic principle of this method is to inject insulin and after a variable period to terminate the hypoglycemic state by the administration of glucose and food. Efforts are directed toward stabilizing the dose of insulin and avoiding the occurrence of actual hypoglycemic coma. The site of the injection should be changed frequently to avoid local tissue irritation and necrosis. The patient, having fasted for from four to twelve hours, is given insulin by deep intramuscular injection of 5 to 15 units. The dose of insulin may be increased by about 10 units daily until mild hypoglycemic shock, manifested by lassitude, increased perspiration, hunger, thirst and somnolence, is produced. The dosage is then kept at a minimal level and shock reactions are avoided by feeding. The amount of insulin required to produce a state of hypoglycemia varies with the individual patient. Usually 50 to 100 units of insulin is sufficient to cause appearance of the desired hypoglycemic manifestations in about an hour. The patient is kept in a state of hypoglycemia for periods ranging from thirty to ninety minutes, and the reaction is then terminated by the administration of sugared fruit juice followed by a meal rich in carbohydrates. If treatment has to be interrupted early, the dosage should be decreased on the following day by 5 to 10 units. Weakness and clamminess after treatment generally indicate incomplete termination. In the mild hypoglycemic state the patient is usually able to take sugared fruit juice orally. Fluids should not be forced if the patient has difficulty in swallowing. Interruption of the hypoglycemia on such occasions is best carried out by the intravenous injection of 20 cc. of a sterile 33.3 per cent glucose solution. This is usually effective in arousing the patient to the point where he will be able to drink.

After termination of treatment the clothing should be changed because of the increased perspiration that has occurred, and chilling of the patient is avoided. My patients are routinely encouraged to exercise a few hours after treatment. They are routinely instructed to carry candy bars for use at the first sign of hypoglycemic symptoms. They are also encouraged to eat as much food as possible during the remainder of the day. Insulin treatment is carried out six times a week with one day's rest. Duration of treatment is determined by therapeutic progress. As a rule, acute states require less time than chronic ones. Generally, treatment is indicated as long as the patient continues to show improvement. Patients should be observed for one month after completion of therapy, which should be resumed at once in the event of relapse.

Therapeutic Results

This report describes a group of 26 heterogeneous cases treated over a three-year period and includes several patients with schizophrenia of many years' standing who showed the usual clinical features of withdrawal, apathy, projection and negativism. Because of the prominent role that insulin occupies in mental disorders and because of the growing recognition of the possibilities of sub-coma insulin treatment, it is believed that some of the clinical observations and data merit attention. Sufficient time has elapsed for the over-all results in the original series of 12 cases to be more accurately appraised, and the increased number of cases treated with the ambulatory method permits more valid deductions concerning the applicability and effectiveness of this management. By and large, the progress of both groups of patients treated has been encouraging and gratifying.

Table 1 contains follow-up summaries of the cases previously reported in which insulin sub-shock treatment was given at home from January, 1945, to February, 1946. Table 2 presents a summary of data and short-term follow-up information of a group of patients subsequently treated during 1946 and 1947. A few of the patients have had follow-up examinations for periods up to two years.

The results in the 26 cases were as follows: all but 1 of the patients treated showed definite clinical improvement of varying degrees. In Group I, 7 out of 12 patients made complete recoveries and have remained well. One patient recovered and subsequently relapsed to a moderate degree. She has remained in a much improved state after a short course of electroshock therapy. This patient refused the full course of treatment, since she felt entirely well and preferred to spend the summer at the beach. One patient, who relapsed fourteen months after termination of treatment, was subsequently treated by narcoanalysis and electric shock and has continued to maintain a much improved state. Two patients who improved moderately discontinued treatment prematurely, but have maintained their clinical gains. One patient was much improved, and his clinical improvement has continued to date.

In Group II, 10 out of 14 patients made complete recoveries. One patient, a schizophrenic of many years' standing in whom an organic brain defect was suspected, made a slight clinical improvement, but subsequently relapsed and regressed. One patient

showed much clinical improvement, but progress was hampered by situational factors. Despite premature interruption of treatment, the clinical gains have been sustained. In 2 other cases, treatment was insufficient, and the clinical improvement was ultimately followed by relapse.

Of the 26 patients treated, 17 were restored to their pre-morbid state and were entirely free of any

In most cases insulin sub-shock therapy produced remarkable improvement in physical condition. The patients frequently gained weight rapidly and developed a feeling of well-being. Another attractive feature of the treatment was that they became more amenable to psychotherapy. Abnormal states marked by fear, doubt, inhibition and misconceptions were often relieved. The rapidity with which

TABLE 1. *Results in 12 Patients Previously Reported.*[9]

Case No.	Age	Sex	Duration of Illness Before Ambulatory Treatment	Clinical Picture	Previous Treatment	Duration of Sub-Coma Insulin Treatment	Clinical Response	Follow-Up Data
	yr.							
1	28	M	15 mo.	Anxiety and tension	Barbiturates; medical management.	11 wk.	Recovery	Patient entirely well at follow-up examination 2⅔ yr. later
2	30	F	12 mo.	Depressive psychosis	None	12 wk.	Recovery	Recovery had persisted at follow-up examination 2 yr., 7 mo. later
3	40	F	4 yr.	Anxiety and tension; emotional instability.	Barbiturates; psychoanalysis; electroshock therapy.	10 wk.	Recovery; relapse.	Slight relapse 1 yr. and 3 mo. after termination of treatment; patient eventually treated with electric shock and has remained much improved for past 13 mo.
4	56	M	17 mo.	Depressive features	Endocrines; opiates; psychotherapy; electroshock therapy.	8 mo.	Recovery	Patient entirely well at follow-up examination 1¾ yr. later
5	37	F	2 wk.	Schizophrenic reaction	Medical management	18 wk.	Recovery	Recovery had persisted at follow-up examination 2 yr., 1 mo. later
6	26	M	10 mo.	Depressive reaction; emotional instability; somatization reaction.	Psychotherapy; vitamins; sedatives.	11 wk.	Recovery	Patient entirely well at follow-up examination 3 yr., 2 mo. after termination of treatment
7	42	F	14 yr.	Anorexia nervosa; emotional instability; anxiety and tension.	Psychotherapy; medical management.	4½ mo.	Recovery	Recovery maintained at follow-up examination 3⅓ yr. later
8	40	F	2 yr., 7 mo.	Anxiety and tension; phobias; emotional instability; somatic disturbances.	Electroshock therapy; psychotherapy; narcoanalysis.	4 mo.	Recovery	Patient has remained entirely well 3 yr. after termination of treatment; gave birth to her first child several months ago.
9	46	F	1⅔ yr.	Anorexia nervosa; anxiety and tension.	Barbiturates in excessive amounts	10 wk.	Moderate clinical improvement; weight gain (12 lb.).	Patient refused full course of treatment; returned to former weight level; follow-up examination 3 yr. later revealed unsatisfactory home situation; weight has remained stationary; no clinical regression.
10	47	M	3½ yr.	Depressive reaction; emotional instability.	Barbiturates; health resorts; osteopathic treatment; psychotherapy; medical management.	18 wk.	Much improvement; slight relapse.	Clinical improvement maintained for 14 mo. aided by supplementary narcoanalysis on 3 occasions; patient eventually relapsed slightly and received short course of electroshock therapy; has continued much improved since then.
11	38	F	6 yr.	Neurotic personality; emotional instability; somatization reaction; weight loss.	Barbiturates	9 wk.	Much improvement; weight gain (12 lb.).	Patient refused full course of treatment and returned to previous clinical state; follow-up examination conducted 1 yr., 11 mo., after discontinuance of treatment disclosed no subsequent weight loss or clinical regression.
12	23	M	5 yr.	Emotional instability; immaturity; inadequacy; somatization reaction.	Psychotherapy	10 wk.	Much improvement; gain in weight; personality improvement.	Clinical gains sustained at follow-up examination 1¾ yr. after termination of treatment; spirits have remained elevated; improvement in attitude of confidence and poise; social and economic adjustment has remained relatively normal.

manifest residual symptoms at follow-up examinations conducted at periods ranging from eleven months to three years and four months after completion of treatment. Premature interruption of treatment appeared to influence the clinical results in 6 cases. Two patients relapsed but subsequently improved with electroshock therapy. Only 2 patients relapsed and regressed.

symptoms of anxiety and tension diminished was often striking.

Case Reports

In the interest of brevity only 5 illustrative cases are reported. They include 4 recoveries and 1 failure.

Case 13. A 40-year-old married woman first developed symptoms of depression in May, 1944. Her husband drank to

excess and was domineering, selfish, abusive and assaultive. Thwarted in her attempt at separation or relief and faced with continued marital discord and stress, the patient sank into a deep depression marked by thoughts of suicide.

At a hospital a course of electroshock treatment brought partial relief for 5 months, but in September, 1946, the patient relapsed. Various forms of medical management as well as psychotherapy proved ineffective. Examination revealed a brow-beaten, preoccupied, depressed, resentful and discouraged woman. Her symptoms included anxiety, tension, insomnia, crying spells and many somatic complaints.

Insulin sub-shock therapy was begun in the patient's home in December, 1946. After 3 weeks of treatment there was a general remission of symptoms. The treatment was continued for 19 weeks, the maximum dose of insulin being 150 units. The patient became more accessible to psychotherapy. Her depression lifted; fear, anxiety and tension abated, and a happier and more satisfactory domestic relationship was effected.

She resumed her social activities and derived considerable pleasure and satisfaction out of life. The home situation has been more harmonious, irritation and frustration have been minimal, and she has remained well for 20 months after termination of treatment.

CASE 14. A 48-year-old single man had shown mental symptoms for 10 years prior to hospitalization in September, 1939. While at the hospital he had been dull, disinterested and emotionally blunted. As time went on he continued to be evasive, suspicious and paranoid in his trends. Although he denied hallucinations, there was evidence that he reacted to them at intervals. In 1944 family placement in the community was tried, but he had to be returned because of poor adjustment. A full course of insulin and metrazol shock treatments brought partial improvement, but he soon relapsed into his former self-absorbed, seclusive state. He constantly refused to occupy himself in any way, and, his appetite having been exceptionally good, he tended to be rather obese. A diagnosis of schizophrenia, paranoid type, was made, but there had been considerable deterioration intellectually and emotionally during the rather prolonged course of his mental illness. He was not considered suitable

TABLE 2. *Results in 14 Patients Treated with Insulin Sub-Shock at Home.*

Case No.	Age	Sex	Duration of Illness Before Ambulatory Treatment	Clinical Picture	Previous Treatment	Duration of Sub-Coma Insulin Treatment	Clinical Response	Follow-Up Data
	yr.							
13*	40	F	2⅘ yr.	Depressive psychosis	Electroshock therapy; psychotherapy.	19 wk.	Recovery	Patient entirely well at follow-up examination 1⅗ yr. later
14*	48	M	17 yr.	Schizophrenia; paranoia.	Insulin and metrazol shock series	11 wk.	Improvement to a degree; relapse.	Follow-up examination 2 yr. later revealed further clinical regression
15*	25	F	9 mo.	Schizophrenic reaction with paranoid trends and depressive features	Electroshock therapy	19 wk.	Much improvement; after 9 wk. of treatment; relapse; recovery after additional 10 wk. of treatment.	Complete clinical recovery after 19 wk. of treatment; patient entirely well at follow-up examination 13 mo. later.
16*	29	F	8 yr.	Obsessive-compulsive state with emotional inadequacy and instability and depressive features	Medical management	18 wk.	Recovery.	Patient entirely well at follow-up examination 1½ yr. after termination of treatment
17*	40	M	3 yr.	Schizophrenia; acute catatonic reaction state.	Electroshock therapy	20 wk.	Recovery after 16 wk. of treatment; slight relapse followed by recovery.	Recovery followed by slight relapse 4 mo. later; maintenance treatment employed for 4 wk., followed by recovery; patient entirely well at follow-up examination 2 yr., 1 mo. later.
18	60	F	5 yr.	Reactive depression; somatization reaction with emotional instability and hypochondriasis.	Operations on gall bladder, uterus and hemorrhoids; medical management.	8 wk.	Much improvement; patient refused full course of treatment; home conditions unsuitable for insulin sub-shock treatment.	Patient showed considerable improvement despite unsuitable treatment setting; at follow-up examination 1⅘ yr. later; clinical gain maintained, but patient showed lack of enthusiasm for improved condition.
19	34	F	8 yr.	Schizophrenic reaction	Electroshock therapy; relapse 1 mo. later.	10 wk.	Fluctuating improvement; poor co-operation; relapse soon after interruption of treatment.	Patient's family unable to cope with situation; treatment discontinued prematurely, with subsequent relapse.
20	34	M	9 mo.	Anxiety and tension	Medical management; excessive barbiturates.	12 wk.	Recovery	Recovery had persisted at follow-up examination 1 yr., 1 mo., after termination of treatment
21	26	F	14 mo.	Schizophrenic reaction	Electroshock therapy	17 wk.	Recovery	Recovery had persisted at follow-up examination 1 yr., 5 mo. after termination of treatment
22	33	F	2 yr.	Anxiety and tension with depressive and compulsive features	Medical management	11 wk.	Recovery	Patient entirely well at follow-up examination 2 yr. later
23	27	F	1½ yr.	Schizophrenia, paranoid type	Electroshock therapy	10 wk.	Much improvement; relapse.	Patient refused full course of treatment, and maintained improvement for 1 yr. and then relapsed
24	56	M	14 yr.	Recurrent depressions	Three courses of electroshock therapy	14 wk.	Much improvement	Improvement continued steadily until complete recovery; patient entirely well at follow-up examination 1¾ yr. after termination of treatment.
25	33	F	3 yr.	Manic-depressive reaction type	Two courses of electroshock therapy with subsequent relapse	16 wk.	Recovery	Complete recovery maintained at follow-up examination 11 mo. later
26	25	M	6 mo.	Anxiety and tension with depressive features	Medical management; psychotherapy; barbiturates in large amounts.	9 wk.	Recovery	Patient entirely well at follow-up examination 1⅗ yr. after termination of treatment

*Cases reported in text.

for leukotomy because of the absence of depression, anxiety and agitation.

Through the efforts of his family, his release from the hospital was obtained. Despite the rather gloomy prognosis, insulin sub-shock treatment was undertaken at home in deference to the wishes of his family.

Daily treatment with sub-coma doses of insulin was begun on September 13, 1946. The clinical response was almost immediate. The patient became more spontaneous, rational and co-operative. His outlook became more objective, and his emotional response more adequate, and after 3 weeks of treatment he managed to work part time as a truck-driver's helper.

However, memory impairment, which had been quite pronounced, failed to improve, and an organic process was suspected. An x-ray film of the skull taken on October 22 was normal. An electroencephalogram was obtained on October 24, with findings consistent with organic brain damage.

Toward the end of November it was noted that he failed to make further improvement and had begun to regress. Carelessness in his personal habits, shallow affective responses and obsessive-compulsive features became prominent, and interest in work waned. The patient had received 11 weeks of treatment with no significant clinical change, the maximum dose of insulin being 90 units. Treatment was discontinued, and he returned to the hospital.

At follow-up examination 2 years later, he had regressed further. He displayed a marked memory defect, lack of interest, apathy and seclusiveness.

Case 15. A 25-year-old overprotected single woman with a history of several frustrating experiences suffered additional bitter disappointment when rejected by her fiance on his return from overseas duty. Overwhelmed by this series of psychic traumas, she succumbed to a schizophrenic psychosis marked by depression, paranoid trends, emotional instability, preoccupation and withdrawal.

Electroshock treatment at a hospital brought temporary relief for 3 months, but in September, 1946, the patient relapsed. Despite attempts at medical management and psychotherapy, little headway was made. She gradually became more depressed, withdrawn and paranoid in her trends. Her family refused permission for electroshock therapy and frowned upon further hospitalization.

Insulin sub-coma treatment was begun at home in December. The first short period of improvement was noted in 3 weeks. Thereafter, intervals of well-being became more prolonged, and symptoms continued to diminish progressively. Psychotherapy was employed advantageously with the patient, who previously had not been readily accessible to such a procedure. These psychotherapeutic sessions proved of value in hastening the disappearance of abnormal functioning and in restoring insight. After 9 weeks of treatment she had gained 14 pounds in weight. The maximum dose of insulin was 110 units. She gradually became more objective, contented and stable and was considered recovered.

She relapsed mildly a month later, and treatment was immediately resumed and weighted in the direction of psychotherapy for a 10-week period. Improvement continued steadily until complete recovery.

This patient subsequently remained entirely well. She has continued in a state of recovery for 13 months since completion of treatment and during the greater part of that time has been gainfully employed as a dressmaker. She continues to be personable, ambitious and objective. In an interview recently with her family, the remark was made, "She has never been so well in her life."

Case 16. A 29-year-old woman, the product of a broken home, was emotionally labile, basically dependent and intellectually inadequate. Her husband, a laborer and of different faith, had an essentially similar personality profile. His overprotective mother was a constant source of friction in the household. As a result of the patient's basic shyness, limited educational and cultural background, she was unable to compete with others, and her social contacts were restricted. A childless marriage helped to make her life drab. There was marked disproportionate sex drive between husband and wife, and when future months left them childless, the patient began to blame herself and experienced feelings of guilt over past sexual indiscretions. Her history had been negative for preceding significant illnesses.

She began to have frequent crying spells, was intensely preoccupied and unable to sleep and began to mutter in a compulsive manner at frequent intervals, "I give my soul to the devil." Anxiety gradually increased; she suffered from anorexia, vomiting and frequent compulsive urges to run to the bathroom. She finally sank into a severe depression. Various types of medical management proved ineffective. The case was not suitable for psychotherapy. Her family refused to sanction hospitalization or electroshock therapy.

Insulin sub-shock therapy was begun at home 9 months after the onset of the illness. She was treated daily for 18 weeks. Her anxiety diminished after 3 weeks of treatment, and the symptoms began to abate. She gained considerable weight and became more cheerful, self-reliant and less preoccupied with feelings of guilt. She continued to improve, the obsessive-compulsive tendencies gradually disappeared, and the depression lifted completely. Even though her disorder was not suitable for psychotherapy, she improved steadily until complete recovery 18 weeks after the institution of treatment.

She subsequently remained somewhat timid, but her ability to mingle socially with others improved and she gradually developed new interests and lived more harmoniously with her husband. On follow-up examination 18 months later, she was entirely well and contented. Social and marital adjustment had continued to be satisfactory.

Case 17. A 40-year-old Italian married man with an extremely unstable heredity and background, and with a history since 1942 of two separate psychotic episodes lasting approximately 8 weeks each, suffered an acute turmoil reaction in 1945.

A course of electroshock therapy and subsequent various forms of medical management brought some palliation, but in May, 1946, he succumbed to a fourth attack characterized by excitement, agitation, refusal of food and personal neglect and undue preoccupation with religion and the abstract, together with a compelling desire to become a crusader and reformer. Hallucinations and delusions were prominent. Aggressive behavior increased to ominous proportions. Hospitalization was not permitted largely because two of his brothers had already been hospitalized in a mental institution.

Insulin sub-shock therapy was begun at home at once. The clinical response was dramatic, and in approximately 2 weeks the excitement had subsided.

Gradually, there was a reduction and finally disappearance of confusion, hallucinations, paranoid ideas and feelings of unreality. Despite the rather recent psychotic manifestations, the patient was soon able to return to work. Anxiety disappeared completely even though he was unable to profit from psychotherapy. The treatment proved especially effective in controlling excitement and in checking hallucinations and delusions.

Improvement with further treatment was steadily progressive, and there was gradual abatement of all symptoms until complete recovery 20 weeks after the initiation of treatment. Except for a mild, brief relapse, treated by a few additional episodes of sub-coma, he has remained well for the 25-month follow-up period.

Advantages

Ambulatory insulin sub-coma is considered a preferred therapeutic measure in psychiatric disorders. The treatment has proved of value in a variety of mental conditions and in many cases that have been refractory to other methods of management. Some of the advantages over the more drastic forms of therapy were described in a previous article.[9] These advantages as well as several others have a practical bearing and deserve emphasis. They include the following:

The treatment can be administered at home and thus obviates the stigma (in the mind of the patient and his relatives) of hospitalization.

Insulin sub-shock therapy is a less drastic procedure than insulin shock and in all probability produces no irreversible brain damage. (Patients given as many as a hundred or more sub-coma treatments showed no evidence of mental deterioration.)

Patients are spared the atmosphere of a hospital, with its locked doors and barred windows.

The treatment is relatively economical, because therapy is administered at home and hospitalization is not necessary.

Complications occur less frequently than with the more drastic forms of therapy.[27, 31]

The treatment is not incapacitating, and the patient is usually able to be up and about promptly. This has two important advantages over other methods: the patient is more amenable to psychotherapy, and he is alert and able to join in activities immediately.

Insulin sub-coma greatly relieves anxiety and tension and is often a better sedative than barbiturates.[9, 24, 27] The effects are more incisive and lasting than those with chemical sedation,[20] which often increases anxiety rather than relieves it. An additional drawback to the use of chemical sedation, especially barbiturates, is the danger of intoxication.

Insulin sub-shock treatment improves the patient's physical condition.

Another reason favoring ambulatory treatment is advanced by Impastato et al.[3]: "Since the ambulatory patient gets well while at home, there is no need for subsequent home readjustment . . . [which] must be achieved by the hospital patient at the end of treatment."

Supplementary treatment in the event of a relapse is often not feasible after the patient has left the hospital. In the ambulatory method there is usually no difficulty in maintaining post-treatment supervision, promptly resuming treatment or in administering occasional subsequent treatment.

Disadvantages

In general, the disadvantages of the ambulatory method of management are outweighed by its social and various other advantages.

A natural disadvantage is the time factor, several hours of the physician's attention usually being required.[9] There has been a tendency on the part of some therapists toward impatience with slower methods of treatment, and a preference for more rapid and less demanding procedures.

The disadvantages of ambulatory treatment described by Fetterman[5] are readily applicable to the method of therapy discussed above. They include the following:

Increased responsibility on the part of the family — the patient may require help in eating and guidance in activity. Those entrusted with the patient's safety must carry out such responsibilities zealously.

The initial improvement may prompt the desire for premature discontinuance of treatment — a contingency that can usually be handled quite adequately in hospital treatment.

The hazard of suicide is of paramount importance and may present a serious problem to home management of the patient. In cases in which the urge to self-destruction is overwhelming, or in which the patient's welfare or that of society is endangered, he should be hospitalized. The suicide hazard in ambulatory treatment can be minimized by careful selection of patients, by early treatment and by constant vigilance on the part of the family.

Home treatment is hazardous and probably contraindicated if there is a clash of personalities in the home situation or if there is lack of understanding of the clinical problems.

Summary

Twenty-six patients treated with the insulin sub-coma method at home are described. Daily treatments were administered for periods ranging from two to eight months. All but 1 of the patients showed definite clinical improvement of varying degrees. Seventeen patients were restored to their pre-morbid state and were free of residual symptoms.

Sub-coma insulin therapy is a relatively safe procedure and can be administered at home.

The advantages and disadvantages of this type of therapy, the technic of administration and the necessary precautions to safeguard the patient are outlined.

Several case histories are presented.

In view of the favorable results achieved and the many advantages offered, further use of sub-coma insulin therapy in the patient's home appears justified.

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DIGITALIS BIGEMINY*

An Analysis of Fifty Cases

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BIGEMINAL rhythm following the administration of digitalis is frequently encountered and is generally accepted as a sign of digitalis intoxication. The characteristics of this type of coupled rhythm, however, are not clearly defined, and there is little in the literature concerning the subject. The present investigation was undertaken in an attempt to elucidate the features of digitalis bigeminy that might be of practical clinical value.

METHODS

The patients studied were limited to those in whom paroxysmal or constant ventricular bigeminy was demonstrated electrocardiographically. Of the electrocardiograms taken from 1929 to 1948 at the Beth Israel Hospital, Boston, 183 separate cases of bigeminy in 174 patients were satisfactory for the purposes of this study. The classification of electrocardiographic bigeminal rhythms presented by Parsonnet et al.[1] was employed.

The clinical records, progress notes and medication charts were examined in each case to evaluate the role of digitalis in the production of the arrhythmia. In 82 cases, referred to below as the nondigitalis or control group, digitalis had not been administered prior to the appearance of bigeminy. In 101 cases digitalis bodies had been administered during the month preceding the appearance of bigeminal rhythm. Digitalis was considered to be a definite causal factor in 50 of these because bigeminy appeared for the first time shortly after a large initial dose, after increase in the maintenance dose, or after a profuse diuresis without change in the maintenance dose. In these cases, referred to below as the digitalis group, confirmatory evidence of this relation was afforded by the disappearance of the arrhythmia with omission or reduction in the dosage of the drug, or by the presence of other symptoms or signs of digitalis intoxication. In a few cases, after reversion to normal rhythm, bigeminy was again induced by an increased dose of digitalis. The relation between digitalis and bigeminy in the remaining 51 cases could not be established or excluded, and these cases were classified as indeterminate.

RESULTS

In 172 cases bigeminy resulted from extrasystolic contractions occurring after each normal beat. The premature beats arose in the ventricles in 107 cases, in the auricles in 42, in the sinus node in 19, and in the auriculoventricular node in 4. In the remaining cases coupling was due to a shifting auriculoventricular block in 7, sinus pauses in 1, and fortuitous pairing of ventricular beats in auricular fibrillation in 3.

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Comparison of the Digitalis and Nondigitalis Groups

Type and dosage of digitalis. At the time of appearance of bigeminy whole-leaf digitalis was being administered orally in 45 cases and digitoxin in 3. In 2 cases a mixture of digitalis glycosides (digalen) was given intramuscularly. The amount of digitalis given and the length of time during which the patient had received the medication before the appearance of bigeminy varied considerably. In most cases bigeminy appeared when the maintenance dose was increased, even in such small amounts as 0.05 to 0.1 gm. In 4 cases a profuse diuresis induced by parenteral administration of mercurial diuretics resulted in bigeminal rhythm without an increase in the maintenance dose of digitalis. In another case the same phenomenon was observed after a massive gastrointestinal hemorrhage.

Age and sex. The average age of the patients in the digitalis group was 53.9 years, whereas in the nondigitalis group it was 56.7 years. There were no significant differences between the two groups in age and sex incidence (Table 1).

TABLE 1. *Age and Sex Distribution of 50 Patients with Digitalis and 82 with Nondigitalis Bigeminy.*

AGE	DIGITALIS GROUP	NONDIGITALIS GROUP
yr.		
0-10	0	3
11-20	0	0
21-30	6	2
31-40	2	7
41-50	10	8
51-60	15	21
61-70	12	27
71-80	4	13
81-90	1	1
Male	22	46
Female	28	36

Heart disease. Organic heart disease or essential hypertension was present in all the cases in the digitalis group and in 77 per cent of the control group. A wide variety of etiologic types of heart disease was encountered in both groups, but hypertensive and coronary-artery diseases were more common in the control group and rheumatic heart disease in the digitalis group (Table 2). With the exception of a case of auriculoventricular nodal rhythm, the basic cardiac rhythm was a normal sinus mechanism in all cases in the control group. In the digitalis group, on the other hand, the basic rhythm was a normal sinus mechanism in 28 cases, auricular fibrillation in 21, and auricular flutter in 1 (Table 3).

Electrocardiographic features. In all cases but 2 the bigeminy in the digitalis group was due to ventricular extrasystoles. In contrast, ventricular extrasystolic bigeminy accounted for only 39 per cent of the cases of coupled rhythm in the nondigitalis group, and auricular and sinus nodal extrasystolic bigeminy were almost as common (Table 4).

The features of the ventricular extrasystolic bigeminy in the two groups are shown in Table 5.

TABLE 2. *Etiologic Types of Heart Disease in Patients with Digitalis and Nondigitalis Bigeminy.*

HEART DISEASE	DIGITALIS GROUP NO. OF CASES	NONDIGITALIS GROUP NO. OF CASES
None	0	19
Rheumatic	21	4
Rheumatic and hypertensive	4	0
Rheumatic and coronary	1	0
Hypertensive	4	15
Hypertensive and coronary	10	17
Coronary	6	21
Syphilitic	1	1
Calcareous aortic stenosis	1	1
Congenital	1	1
Indeterminate	1	3
Totals	50	82

Multifocal ventricular premature beats giving rise to bigeminy occurred only once in the nondigitalis group but were encountered 14 times in patients in the digitalis group. Ventricular premature beats arose in both ventricles in 8 cases of the digitalis group but not in a single case in the control group. On the other hand, basal ventricular premature contractions resulted in bigeminy in 10 cases in the nondigitalis group but not once in the digitalis group. The premature ventricular contractions of unifocal origin arose in either ventricle in both groups, but arose more commonly in the right ventricle in the digitalis group, and in the left ventricle when the bigeminy was unrelated to digitalis. There was no significant difference in the two groups in the incidence of fixed and nonfixed coupling.

TABLE 3. *Basic Cardiac Rhythms of Patients with Digitalis and Nondigitalis Bigeminy.*

RHYTHM	DIGITALIS GROUP NO. OF CASES	NONDIGITALIS GROUP NO. OF CASES
Normal sinus	28	81
Auricular fibrillation	21	0
Auricular flutter	1	0
Auriculoventricular nodal	0	1
Totals	50	82

TABLE 4. *Electrocardiographic Features in 50 Cases of Digitalis and 82 of Nondigitalis Bigeminy.*

TYPE OF BIGEMINY	DIGITALIS GROUP	NONDIGITALIS GROUP
Sinus nodal extrasystolic	0	16
Auricular extrasystolic	1	29
Auriculoventricular nodal extrasystolic	1	3
Ventricular extrasystolic	46	32
Sinoauricular block	1	0
Auriculoventricular block	1	2
Coupling fixed	35	56
Coupling not fixed	15	26

Other manifestations of digitalis toxicity. The relation between the appearance of bigeminy and other signs and symptoms of digitalis intoxication was inconstant. In some cases bigeminy was the first or only manifestation of digitalis overdosage; in others it developed concomitantly with or followed the appearance of anorexia, nausea, vomiting or visual disturbances. In 7 cases digitalis overdosage produced paroxysmal arrhythmias in addition to bigeminy. The abnormal rhythms were ventricular tachycardia in 4 (2 with bidirectional complexes), auricular flutter in 1, auricular fibrillation in 1, and both paroxysmal auricular fibrillation and auriculoventricular nodal tachycardia in 1. In 6 of these cases bigeminy was recorded after cessation of the paroxysmal arrhythmia; in 1 it appeared first, and was followed by paroxysmal tachycardia consequent to the administration of additional amounts of digitalis.

TABLE 5. *Electrocardiographic Features in 46 Cases of Digitalis and 32 of Nondigitalis Ventricular Extrasystolic Bigeminy.*

ELECTROCARDIOGRAPHIC FEATURE	DIGITALIS GROUP	NONDIGITALIS GROUP
Focality:		
Unifocal	32	31
Multifocal	14	1
Point of origin*:		
Right ventricle	21	7
Left ventricle	9	12
Both right and left ventricles	8	0
Apical portion	3	0
Basal portion	0	10
Septal portion	2	0
Indeterminate origin	3	3
Coupling:		
Fixed	34	24
Not fixed	12	8

* Determined by the method described by Burch and Winsor.[2]

Duration of digitalis bigeminy. Although in most cases bigeminy was a temporary phenomenon, in a few cases the bigeminal rhythm, once induced by digitalis, persisted for many days after omission of the drug and in some was apparently permanent. Fourteen patients in the digitalis group died during the period of observation. In 11 cases additional amounts of digitalis had been given despite the presence of bigeminal rhythm, and in 3 bigeminy appeared for the first time on the day of death.

DISCUSSION

Despite its clinical importance and the frequency with which it is encountered digitalis bigeminy has attracted but little attention, especially in the American literature. Most publications concerning digitalis bigeminy antedate 1930, and since then only an occasional reference to the subject has been made. As far as could be determined the only clinical analyses of relatively large series of cases were those of Edens and Huber[3] in 1916 and Gold and Otto[4] in 1926.

Edens and Huber[3] recorded 29 cases of digitalis bigeminy, but in only 6 were electrocardiograms taken. In 27 the bigeminal rhythm was due to ventricular extrasystoles as determined by jugular-pulse tracings, and in the remaining 2 the mechanism was indeterminate. Congestive heart failure was present in all, and 13 patients had auricular fibrillation. These authors concluded that digitalis bigeminy occurred only in hypertrophied hearts that manifested decreased muscular efficiency. Because 23 patients died within two years of the appearance of bigeminy digitalis coupling was considered to indicate a poor prognosis.

Gold and Otto[4] reported the cases of 45 patients with digitalis bigeminy. All had organic heart disease, the etiologic type being arteriosclerotic in 8, rheumatic in 16, syphilitic in 4, not specified in 2 and unknown in 15. The basic cardiac rhythm was auricular fibrillation in 35 and normal sinus rhythm in 10. In the latter group 8 patients later developed auricular fibrillation. In all cases bigeminy was due to ventricular premature beats. In contrast to Edens and Huber,[3] the authors believed that susceptibility to digitalis bigeminy did not indicate a grave prognosis beyond that due to the underlying heart disease and the functional capacity of the heart.

In 1926, Gallavardin[5] presented a clinical discussion of digitalis coupling and summarized the previous French literature. He stated that although others had emphasized the frequency of digitalis bigeminy in patients with enlarged hearts with mitral disease, the arrhythmia could occur in patients with all types of heart disease and with normal sinus rhythm as well as auricular fibrillation. The bigeminy that he encountered was always due to ventricular extrasystoles, which in the majority of cases were polymorphic. He believed that digitalis bigeminy occurred only in the presence of a diseased myocardium, for in his experience the arrhythmia was never induced by digitalis in normal hearts.

Scherf and his co-workers have reported a number of experimental and clinical observations regarding digitalis extrasystoles and bigeminy. Their findings and conclusions have recently been summarized by Scherf and Boyd.[6] They favor the view that digitalis alone will not produce extrasystoles or bigeminy and that other unknown conditions, which vary considerably from case to case, must be present for the induction of bigeminy by the drug. In their experience the arrhythmia was precipitated by digitalis more easily in patients with severe heart disease, and the extrasystoles in most cases arose from multiple foci.

On the whole, the results of our study are in agreement with the findings discussed above. In our cases bigeminal rhythm was induced by purified digitalis derivatives as well as the whole-leaf product. There was no specific relation to age or sex. It appeared in patients with all types of heart

disease, but more often complicated rheumatic heart disease and auricular fibrillation. Although there was marked individual variation in the amount of drug administered prior to the development of the arrhythmia, bigeminy in the majority of cases was a sensitive manifestation of toxicity, appearing for the first time after a small increase in the maintenance dose.

The electrocardiographic features of digitalis bigeminy, as a rule, differed from those in the group that was unrelated to digitalis. Digitalis bigeminy was almost always due to ventricular extrasystoles, and the ventricular premature beats were more likely to be multifocal in origin and to arise in the right ventricle; in no case did they originate from the basal portion of the ventricles. Rare cases of coupled rhythm arising from other causes were also recorded in the digitalis group. One case of coupling due to shifting auriculoventricular block was similar to that described by Lutembacher.[7] In addition 1 case each of bigeminy due to sinoauricular block and to auricular and auriculoventricular nodal premature beats were encountered.

In many of our cases bigeminal rhythm was the only evidence of digitalis intoxication. The appearance of an arrhythmia as the first sign of digitalis poisoning has also been noted by Marvin,[8] who reported 5 cases of ventricular tachycardia following excessive dosage of digitalis. Similarly, Grishman and Dack,[9] in a recent study of 50 cases of digitalis toxicity, observed that various arrhythmias were often the only clinical manifestation of overdosage. There was no definite relation between the appearance of digitalis bigeminy and other manifestations of toxicity. The arrhythmia preceded, followed or developed simultaneously with the other signs and symptoms.

The seriousness of digitalis bigeminy is difficult to evaluate. White[10] has stated that the appearance of bigeminal rhythm "indicates that a considerable percentage of a lethal dose has been given, probably close to 75 per cent." The possibility that further administration of digitalis to a patient who has developed coupling will lead to serious or fatal poisoning is apparent. Bigeminy, therefore, is a danger signal that cannot be ignored. In some or all of the 14 fatal cases in our series death may have been due to digitalis, since all patients had received large amounts of the drug.

The conditions that must be present in the myocardium for the production of bigeminy are unknown. Although bigeminy occurs in the absence of heart disease, clinical observations indicate that digitalis bigeminy occurs only in the presence of a diseased myocardium. This thesis is further substantiated by animal experiments and observations on the effect of large doses of digitalis in people with normal hearts. In the intact mammalian heart in situ irregular extrasystoles occur only in the last stages of digitalis poisoning, and bigeminy is never produced.[11] The subendocardial hemorrhages and necroses induced in animal hearts by large amounts of digitalis,[12, 13] therefore, apparently do not increase the susceptibility to bigeminy. In human subjects with normal hearts who have ingested large amounts of digitalis bodies in suicidal attempts, repeated electrocardiograms have revealed a variety of serious arrhythmias and only rare extrasystoles, but no bigeminy.[5, 14–16] Digitalis was administered to 100 persons without heart disease by Wolff,[17] and although repeated electrocardiograms revealed definite changes in the ST segments, T waves and PR intervals, only two ventricular premature beats were noted in 300 electrocardiograms. In the recent New York insurance fraud large doses of digitalis were ingested by a number of persons in an attempt to simulate heart disease, and in this group only occasional ventricular extrasystoles were detected and bigeminy was not reported.[18]

Summary and Conclusions

One hundred and eighty-three cases of bigeminy were studied in regard to the etiologic relation between digitalis and the coupled rhythm. Bigeminy was associated with digitalis in 50 cases and unrelated to digitalis in 82. In 51 the relation was indeterminate.

Bigeminal rhythm is common in patients with or without organic heart disease who have not received digitalis, and in 39 per cent is ventricular extrasystolic in mechanism.

Bigeminal rhythm may be induced in patients with organic heart disease by digitalis and is almost always due to ventricular extrasystoles.

The ventricular extrasystolic bigeminy associated with digitalis differs from that unrelated to digitalis in that the ventricular premature beats are more commonly multifocal and arise in the right ventricle. In nondigitalis bigeminy ectopic contractions arise more frequently in the left or basal portions of the ventricles.

Digitalis bigeminy occurs in all types of heart disease and with a variety of basic rhythms, but more often complicates rheumatic heart disease and auricular fibrillation.

Bigeminy may be induced by purified digitalis derivatives as well as the whole-leaf product.

Digitalis bigeminy is a sensitive manifestation of toxicity and may appear with a small increase in the maintenance dose.

Bigeminy may be the only evidence of digitalis intoxication and may precede, follow or develop simultaneously with other manifestations of toxicity.

Bigeminy may be a serious sign of digitalis toxicity and in some cases may herald sudden death.

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STREPTOMYCIN IN THE TREATMENT OF EXTRAPULMONARY TUBERCULOSIS*

Early Results

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THIS report deals with 92 cases of extrapulmonary tuberculosis treated with streptomycin in various amounts and over different lengths of time. In all cases the lesions were proved to be tuberculous by guinea-pig inoculation or x-ray study or both. No pulmonary activity was found except in 2 cases, in which an incipient pulmonary lesion was readily controlled by streptomycin. In the majority of these cases residua from previous pulmonary infection with tuberculosis could be demonstrated. In every case the intradermal tuberculin reaction was positive. Many of these patients had more than one tuberculous lesion, and 157 active lesions were present. No consideration was given to lesions arrested prior to streptomycin treatment. A tuberculous infection of one or both kidneys with urinary-bladder involvement was regarded as a single entity. A bone sinus originating from a tuberculous arthritis was counted as two separate lesions because of the somewhat different course these lesions might take; the bone sinus might heal promptly, but the tuberculous process in the joint might continue to smolder.

CLASSIFICATION

To obtain a clear-cut picture, the results were graded into excellent, good and failure. The term "excellent" was used in cases that fulfilled the following conditions: no material positive for tuberculosis on guinea-pig inoculation was obtainable; marked improvement in the general condition, cessation of pain, closure of sinuses, disappearance of palpable abscesses and freedom from symptoms were achieved; and subsidence of activity by x-ray checks, disappearance of abscess shadows and effusions in and at the bones and joints were observed.

"Good" results were claimed when improvement in the general condition was noted, with a decrease of symptoms, such as diminished discharge from sinuses, reduction in the size of lymph-nodes and abscesses, improvement in the x-ray appearance of lesions and partial return of function in paralysis.

The term "failure" is self-explanatory.

By necessity this classification has to be arbitrary. An absolute and clear distinction between the effects of streptomycin and the results of sanatorium care combined with surgical operation could not be undertaken. It might be well to point out now, and again later, that the reported results could only be obtained under sanatorium care. As only one to nine months have elapsed since termination of streptomycin treatment, this report must be regarded as preliminary.

DOSAGE

One of the main difficulties of streptomycin therapy was, and still is, the selection of the proper dosage.[1,2] The initial recommendation to give streptomycin for prolonged periods (one hundred and twenty days and more) in high dosage (3.0 gm. and more per day) divided into multiple intramuscular injections was soon abandoned because of the high incidence of untoward reactions. Only 3 cases in this study were treated according to the schedule mentioned above, and even in these cases the daily dose had to be dropped quickly from 3.0 to 2.0 gm. or less, because of severe dizziness and beginning deafness.

Owing to the existing uncertainty concerning dosage an effort was made to individualize the treat-

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ment and not to adhere too strictly to a rigid schedule. Eleven cases were treated over one hundred days. The longest treatment period was one hundred and seventy-five days. Forty patients received streptomycin for forty-two days or less, and in 41 cases the length of treatment varied between fifty and one hundred days. A daily dosage of 0.5 gm. divided into two intramuscular injections was used in 37 cases. A dose of 1.0 gm. daily was received by 55 patients. In children only half the dose was used —0.5 and 0.25 gm. respectively.

Sensitivity

In the more recently treated cases, a dosage of 1.0 gm. a day for forty-two days was adopted. Such a treatment schedule conforms with the present views of streptomycin fastness,[1] which is assumed to develop between thirty and sixty days in the majority of cases. In this study no attempt was made to demonstrate fastness by laboratory methods, but clinical observation in some cases of tuberculosis of the kidney bore out the fact that after as early as thirty days any improvement stops and decrease of urinary urgency and frequency ceases. Further administration of streptomycin in such cases was followed by aggravation of clinical symptoms.

Second Course

Streptomycin fastness is probably the reason why a second course[3] with streptomycin usually gives disappointing results. Six patients received a second course of streptomycin. None of these cases gave excellent results. In 3 cases good results were obtained, and 3 cases had to be labeled as failures. It is therefore advisable to determine the sensitivity to streptomycin before a second course is undertaken.

Results

In this study 157 lesions were treated. Excellent results were obtained in 50 per cent; and good results in 36 per cent; 14 per cent were failures.

A summary of the results is presented in Table 1.

Recurrence

Recurrence or development of a new lesion during or after a course of streptomycin was seen in 7 cases, or 8 per cent. The impression was gained that the reactivated or newly developed lesion was altered and of less intensity. Two spinal lesions, for instance, diagnosed shortly after the beginning of streptomycin therapy, showed minimal evidence of destruction and soon became inactive.

Sinuses

Best results were achieved in the treatment of sinuses. A total of 48 tuberculous sinuses in 33 patients were treated; 67 per cent were closed in an average of sixty-two days, 33 per cent improved, and in none had failure to be conceded. The sinuses had drained for an average of nine hundred and fifty-four days before treatment with streptomycin was started. These favorable results cannot be credited entirely to streptomycin since penicillin was frequently given before or simultaneously with streptomycin to combat secondary infection. In addition, a dressing technic comparable to the sterile requirements of surgical wounds was applied to prevent introduction of new pyogenic organisms into the sinuses.

Bones and Joints

Fifty-seven lesions of bones and joints were treated with streptomycin. Excellent results were obtained in 35 per cent, and good results in 47 per cent, and 18 per cent failed to respond to the drug. The evaluation of bone lesions is extremely difficult — bone changes are slow, and x-ray signs of healing are not immediately apparent. Gain in clarity and distinctness in the x-ray appearance, and repair and arrest of the destructive process could be observed either immediately after termination of treatment or within the next few months. Changes in the soft tissues surrounding the lesion are seen more promptly, as manifested in decrease or disappearance of abscess shadows and joint effusions. As valuable as this acceleration in the healing process may be, the emphasis should be placed upon the fact that streptomycin renders the tuberculous patient operable in a much shorter time than conventional treatment does and that it permits the surgeon to enter diseased tissue with less risk of propagation of the tuberculous process, thus allowing greater freedom in the choice of operation and more radical procedures. Under the protection of streptomycin, radical extirpation of a tuberculous bursa and removal of a sequestrated femoral head were carried out and were followed by an uneventful postoperative course not marred by sinus formation or wound breakdown.

Table 1. *Results of Streptomycin Therapy in 157 Tuberculous Lesions.*

Lesion	No. of Cases	Excellent Result	Good Result	Failure
		no. of cases	no. of cases	no of cases
Sinuses	48	32 (67%)	16 (33%)	—
Genitourinary infection	23	12 (52%)	3 (13%)	8 (35%)
Bones and joints	57	20 (35%)	27 (47%)	10 (18%)
Skin mouth and pharynx	3	3	—	—
Lymph nodes	5	2	3	—
Peritonitis	3	1	2	—
Tendosynovitis and bursitis	4	2	2	—
Mastoid	4	1	3	—
Paraplegia	4	2	1	1
Meningitis	4	—	—	4
Pulmonary	2	2	—	—
Totals	157	77 (50%)	57 (36%)	23 (14%)

Genitourinary Tract

Twenty-three cases of tuberculous kidney were treated. Fifty-two per cent gave excellent results,

and 13 per cent good results, and 35 per cent were failures. The result of treatment of tuberculosis of the kidney and bladder had previously been extremely disappointing, and even after removal of the diseased kidney the majority of patients continued to excrete urine containing tubercle bacilli. Patients with bilateral involvement appeared doomed, and early detection during the period of unilateral involvement followed by radical surgery was therefore the only hope. The introduction of streptomycin promises a radical change for the better.

Out of the 15 cases in which nephrectomy was performed and in which the urine remained positive for tuberculosis after operation, 74 per cent were rendered negative, and no reversal of urine took place in only 13 per cent. In the nonoperative group treated with streptomycin the rate of failures ran as high as 75 per cent.

Early diagnosis and radical operation are still imperative, but by the administration of streptomycin shortly before and after nephrectomy the percentage of clinical arrest of the disease is greatly improved. At the same time, the development of postoperative kidney sinuses is in many cases eliminated or early closure of the existing sinuses ensured.

In a comparative study, not yet completed, dealing with postoperative results in tuberculous kidneys before the streptomycin era, urine free of tubercle bacilli was obtained in only 38 per cent of cases.

Fear that a patient with impaired kidney function will tolerate streptomycin poorly is not unfounded, and the incidence of side reactions is slightly higher (38 per cent) than that in cases with unimpaired kidney function. But by the employment of dosages not exceeding 1.0 gm. daily, these side reactions rarely reach serious proportions. A slight rise in the nonprotein nitrogen during the treatment was seen. The greatest increase was 14 mg. per 100 cc.

Lupus Vulgaris

The limited experience gained from 2 cases of lupus vulgaris, 1 involving the face and neck and the other involving the mucous membranes of the nose, confirmed other reports,[3] that streptomycin causes prompt arrest. The same excellent results were obtained in a pharyngeal lesion.

Tuberculous Lymph Nodes

Of 5 cases of tuberculous adenitis, 2 reacted excellently and 3 showed improvement characterized by diminution of the size of the lymph nodes and closure of existing sinuses. Hard indurated nodes showed slow response.

Tuberculous Peritonitis

Three cases of tuberculous peritonitis were treated, 1 with excellent results, and 2 with marked improvement. Abatement of fever, cessation of pain and drying up of ascites were observed. These results were confirmed by x-ray films, which revealed increase in clarity and decreasing density of the abdominal structures. The more acute the disease, the more dramatic the rate of improvement.

Tuberculous Mastoiditis

Satisfactory results were also obtained in 4 cases of mastoiditis. One of these patients responded excellently. Not only was improvement noted in the x-ray appearance of the mastoid bones but also the hearing became more acute, the discharge from the chronically infected ears stopped or diminished, and the patients became free of pain.

Tuberculous Bursitis and Tendosynovitis

Four cases of tuberculous bursitis and tendosynovitis were treated — 2 with excellent results and 2 with good results as evidenced in a decrease of swelling and painless motion.

Paraplegia

Series of 3 or 4 cases have only limited significance and do not show more than a trend. Nevertheless, the results in even a small series of paraplegic cases were regarded as important. Paraplegia during the course of Pott's disease is not an uncommon occurrence. This paraplegia is rarely the result of the spinal deformity, but is caused either by pus formation or by tuberculous granulation tissue pressing against the cord.

Of the 4 patients treated with streptomycin, 2 responded wirh complete restitution of muscular power and return of normal reflex activity. One patient improved considerably. The fourth, a paraplegic patient of long standing who had not been helped by extensive surgical procedures, did not respond. At present 1 patient is under treatment, and the progress is quite promising.

Side Effects

Owing to moderation in dosage, side effects were comparatively mild. Twenty-five per cent of the total cases showed some untoward effects. Vertigo was observed in 15 per cent, skin rash in 6 per cent, and vomiting, nausea and paresthesia of the lips or fingers in 2 per cent each. Only in 6 cases was it necessary to discontinue streptomycin. One of these cases was especially instructive, since the patient had become sensitized by the use of streptomycin ointment. A form of exfoliative dermatitis developed three days after intramuscular use of streptomycin. This dermatitis healed promptly after discontinuation of the drug. None of the side effects observed were permanent, although in some cases, which had received higher dosage, vertigo persisted for months.

Economic Aspects

Any treatment that is capable of shortening the exceedingly long course of tuberculosis will have profound effects on the economic, social and psychologic aspects of the disease. In the series of cases cited, the average time from onset of the disease to the beginning of streptomycin treatment was three years, eight months and six days. To salvage patients after such long suffering and to return them to active life after an average treatment period of one year is a significant achievement. The saving in taxpayer's money and the elimination of sources of infection are important considerations.

A most gratifying result is the change in the patients' psychology. The feeling of resigned suffering and doom and the passive acceptance has given way to hope and confidence. The doctor on a tuberculous ward is no longer a dispenser of analgesics and hypnotics, but is able to prescribe and direct active treatment.

Conclusion

It can be concluded that streptomycin is a valuable asset in the treatment of extrapulmonary tuberculosis. The first course is usually more effective than a second course, and proper timing of the first course is therefore important. In surgical cases its use just prior to or shortly after surgery is recommended. A daily dose of 1.0 gm. in adults for forty-two days is used at present. Encouraging results were obtained in tuberculosis of the bones and joints with and without draining sinuses, of the genitourinary tract, in paraplegia due to Pott's disease and in lesions of the skin and pharynx. Mild side reactions, if encountered, do not preclude continuation of treatment. More severe reactions, which interfere with the general condition of the patient, should be regarded as indications to terminate streptomycin treatment. Second courses have little, if any, value unless definite sensitivity of the bacilli to streptomycin can be demonstrated. Best results are achieved under a sanatorium type of treatment combined with surgical operation when indicated.

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PRACTICAL CONSIDERATIONS OF CLINICAL OXYGEN LACK*

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WHEN confronted with a patient whose problem may in part be due to oxygen lack, the physician often bases his opinion upon the presence or absence of dyspnea and cyanosis, forgetting that these important signs are but two of the many changes due to anoxia. He may not realize that either or both may be present even though oxygenation is adequate, and he may not appreciate that both may be absent even when oxygen lack is severe. In its classic form anoxia may be recognized at a glance, but in other circumstances, not infrequently encountered in practice, the most elaborate laboratory procedures cannot give a definitive evaluation of the adequacy of the oxygen supply to the body. The best that a practitioner can hope to do in this complex situation is to maintain a high index of suspicion for the presence of anoxia in certain pathologic conditions, and to institute therapeutic or prophylactic procedures when certain signs and symptoms of anoxia are first noted. Some of the common conditions that frequently result in anoxia, as well as the more reliable indications of anoxia, are discussed in this paper.

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From the Exeter Clinic.

Causes of Oxygen Lack

It is the relation of oxygen supply to demand, rather than either alone, that determines whether or not tissue anoxia is present. If tissue demand exceeds supply, no matter how great the latter may be, anoxia develops at once, for oxygen cannot be stored. Therefore, conditions that increase the bodily need for oxygen (exertion, fever and hyperthyroidism, for example) cause anoxia unless supply is accordingly increased, just as interference with oxygen supply (high altitude, pulmonary and circulatory disease and so forth) does unless tissue demand is decreased. Very often a disease both decreases supply and increases demand (pneumonia with fever, cardiac failure and exertion), which doubly impairs tissue oxygenation. Most physicians are aware of the seriousness of febrile disease, especially pulmonary disease, in the patient with hyperthyroidism. Discrepancy between supply and demand is further illustrated by the difficulty experienced on exertion by anemic persons, by those with chronic pulmonary disease and by patients with circulatory insufficiency. The high mortality that attends pneumonia in visitors

to high altitudes and in patients with chronic pulmonary or cardiac disease is well known.

Table 1 presents some of the common conditions that often cause clinically important oxygen lack.

Detection of Anoxia

As in so much of medicine, a high index of suspicion is the first prerequisite for the detection of anoxia except in its most flagrant form. It is the old story of "seek and ye shall find, seek not and ye find nothing."

Table 1. *Outline of Causes of Tissue Anoxia.*

I. Oxygen Demand Normal — Oxygen Supply Decreased.
- (a) *Environmental* — low partial pressure of oxygen in inspired air (high-altitude, asphyxia);
- (b) *Pulmonary* — impaired respiratory exchange (emphysema, asthma, poliomyelitis);
  - — diminished alveolar surface (pneumonia, infiltration, atelectasis);
  - — impeded alveolar — arterial diffusion (pulmonary edema, fibrosis).
- (c) *Circulatory* — inadequate cardiac output (myocardial weakness, valvular disease, pericarditis);
  - — inadequate or abnormal vascular bed (arteriosclerosis, arterial spasm, arteriovenous fistula, Paget's disease);
  - — inadequate oxygen carrying power (anemia, carbon monoxide poisoning, methemoglobinemia).
- (d) *Tissue* — inadequate capillary flow (spasm, frostbite);
  - — impeded capillary — tissue diffusion (?) (scleroderma, edema);
  - — defective oxidation — reduction enzyme systems (cyanide poisoning, vitamin deficiency (?)).

II. Oxygen Demand Increased — Oxygen Supply Normal
- (a) Generalized — exercise, fever, hyperthyroidism.
- (b) Localized — infection.

Cyanosis

Cyanosis is, of course, the most reliable indication of anoxia. This blueness of the lips, nail beds and mucosa depends upon the absolute amount of reduced hemoglobin in the capillary blood rather than upon the proportion of reduced to oxygenated hemoglobin. Years ago Lundsgaard and Van Slyke[1] showed that a minimum of 5 gm. of reduced hemoglobin per 100 cc. of blood must be present in capillary blood before cyanosis is apparent. Under ordinary circumstances arterial blood is 95 to 98 per cent saturated with oxygen, decreasing as it passes through the capillaries to 70 per cent saturation in mixed venous blood. Therefore, 25 to 28 per cent of the circulating hemoglobin, or 3.0 to 3.5 gm., is the maximum amount of reduced hemoglobin present at any point along the capillary, and this is less than the 5.0 gm. necessary to produce cyanosis. If, however, the saturation of either mixed venous or arterial blood decreases, so that the average amount of reduced hemoglobin in the capillary is 5 gm. or more, cyanosis will appear. The polycythemic patient who may have as much as 20 or 25 gm. of hemoglobin per 100 cc. of blood will show cyanosis even under the ordinary conditions outlined above, because more than 5.0 gm. of reduced hemoglobin is present. By contrast, in severe anemia when circulating hemoglobin may be as low as 5.0 gm. cyanosis can never appear, because this would require total reduction of all hemoglobin, a manifest impossibility. In less severe anemia, cyanosis may appear only when the oxygen lack is already very marked.

Furthermore, as Comroe and Botelho[2] have demonstrated, cyanosis is dependent not only upon variable factors in the patient but also upon the ability of observers to recognize color changes, and serious degrees of anoxia frequently go undetected without laboratory aid. Kubicek,[3] referring to anoxia in poliomyelitis, makes the following observation:

> Clinically, cyanosis has too frequently been regarded as the first sign of oxygen deficiency and as an indication that remedial therapy should only then be initiated. Unfortunately cyanosis is seldom detectable if the saturation of hemoglobin is above 80%. When cyanosis is first visible, the flow of oxygen from capillary blood to nerve may be reduced by at least 65%. This makes it obvious why patients with bulbar poliomyelitis who become cyanotic so frequently succumb.

When a well equipped laboratory is available, arterial blood is easily analyzed for oxygen content and capacity, but even these figures represent only the oxygen available at the arterial end of the capillary; arterial oxygen content gives no hint of the amount of oxygen delivered to the tissues, which can only be estimated approximately if mixed venous blood is simultaneously analyzed. No methods at present available indicate whether or not oxygen supply is equal to oxygen demand.

Dyspnea

Dyspnea, the second major symptom of oxygen lack, has been defined as the consciousness of the necessity for increased breathing. Oxygen lack does stimulate respiration, probably through the carotid body rather than by direct action on the respiratory center, but its effect is variable and often weak. An impressive and practical demonstration of the weak stimulus given by anoxia to respiration was seen in the course of the altitude-training program during the war, when thousands of healthy young aviators briefly lost consciousness from oxygen lack alone, often without significant increase in respiration.[4] Patients of low sensitivity may overbreathe considerably and yet be unaware of dyspnea. Conversely, the hypersensitive person may feel unable to get his breath, even though his respiratory exchange is normal or slightly increased. Furthermore, since the purpose of respiration is not only to provide oxygen for the body but also to eliminate carbon dioxide, a disturbance of this elimination will also cause dyspnea; the hyperventilation of acidosis is due not to oxygen lack but to carbon dioxide excess. Finally, the hysterical or neurasthenic patient, or one with a cerebral lesion, may overbreathe to a severe degree even though no metabolic abnormality may be present initially. Carryer[5] has recently indicated that the

alkalosis resulting from hyperventilation causes peripheral vasoconstriction and thereby may cause significant tissue anoxia.

From these brief paragraphs it is apparent that cyanosis is often present even though oxygenation is adequate, and that severe anoxia may be present without clinically detectable cyanosis. Furthermore, oxygen lack is only one of the many causes of dyspnea, and sometimes an ineffective one at that.

The mental signs of anoxia may be subtle and easily mistaken for primary neurologic disease. Mental confusion, emotional lability, errors in judgment, inability to concentrate, headache or gross tremors are frequently caused by oxygen lack alone and may be a principal evidence of its presence. These signs and symptoms are often seen in elderly persons with arteriosclerosis, in patients with chronic pulmonary disease, anemia, carbon monoxide poisoning, and other conditions that cause chronic, low-grade tissue anoxia.

Circulatory Effects

Among the circulatory changes that occur, tachycardia is regarded by some workers as one of the most reliable signs of oxygen lack, and an indication of the need for therapy. The increase in heart rate, as well as an increase in stroke output, is an adaptive mechanism by which the body attempts to deliver a greater minute volume of oxygen-carrying blood in an effort to decrease the oxygen lack. An immediate increase in the apparent red-cell count occurs within forty-eight hours of anoxia, owing to hemoconcentration; the true increase in total red cells requires a longer time (seven to fourteen days).

Two dramatic and important responses to anoxia were seen during the training exposure of young aviators to high-altitude anoxia in decompression chambers during the war. If the oxygen lack were produced rather slowly (twenty to forty minutes) and in moderate degree (18,000 feet, or 10 per cent oxygen), about 1 or 2 per cent of these men developed pallor, sweating, nausea, bradycardia, fall in blood pressure and collapse. This syndrome, commonly known as vasovagal syncope or primary shock, is a nonspecific response to a wide variety of stimuli, among which are hunger, fear, emotional stress and pain. When full oxygen was restored, the men recovered consciousness at once, though the other symptoms were prominent for an hour or longer. By contrast, if the oxygen lack were sudden (one or two minutes) and severe (30,000 feet, or 7 per cent oxygen) vasovagal syncope was rarely seen. Instead the men grew confused, the pulse rate was increased, blood pressure normal, or elevated, and muscular inco-ordination and sudden loss of consciousness occurred rapidly. All effects were immediately reversed with oxygen. There is good reason to believe that either of these clinical pictures can occur as a result of disease or injury causing anoxia, and either type of reaction may be very confusing to the physician. Vasovagal collapse caused by anoxia probably is often mistaken for shock, hemorrhage, adrenal insufficiency, birth injury and so forth.

Once oxygen lack is suspected as contributing to a given symptom complex, the physician must attempt to correct the discrepancy between oxygen demand and supply. Increasing supply by providing an atmosphere high in oxygen (by mask, tent or nasal catheter) will greatly help many conditions, particularly those in which oxygen lack is from environmental or pulmonary causes. In other conditions it is the transportation of oxygen that must be improved — by digitalis if the myocardium is weak or by transfusion if circulating hemoglobin is low. Often, it is sufficient merely to decrease the tissue demand for oxygen, by strict rest or reduction of high fever, or by correction of an abnormally elevated metabolic rate. Obviously, optimum therapy will increase supply, improve transportation and reduce demand by all appropriate measures.

The physician must be careful not to interfere with natural mechanisms that the body develops to decrease anoxia, of which increased respiration may be very important. If respiration is depressed (by morphine, strapping the chest, ill advised recumbency) mild anoxia may become severe, and alarming symptoms may result. I was recently responsible for such an event in an obese, elderly man who had experienced a very severe gastric hemorrhage. Owing to his anemia he showed some air hunger, which greatly increased when his temperature rose to 103°F. during a transfusion reaction. Morphine, given to allay restlessness, depressed his respirations, and he became irrational and violent. When the morphine was discontinued and respirations again increased, the symptoms of cerebral anoxia improved, but not until his anemia was further corrected did all symptoms of anoxia disappear. It is worthy of note that at no time was he cyanotic, for his circulating hemoglobin (less than 5 gm.) was fully oxygenated, even though he was severely anoxic. In this case obesity, fever and activity all increased the need for oxygen, whereas anemia and morphine-suppressed respiration decreased the supply.

If the physician suspects that a patient's mental confusion, irritability, dyspnea or tachycardia may be due in part to anoxia, it is not sufficient simply to give oxygen therapy. Every effort must be made to visualize the dynamics of oxygen lack, and therapy should include all the measures that increase supply, improve transportation and decrease demand. To increase the supply, treatment should increase inspired oxygen, facilitate respiration, correct anemia and improve circulation; to decrease demand, it should reduce activity (mental and physical), lower fever and diminish abnormally elevated basal metabolic rate.

Summary

The common causes of clinically important oxygen lack are presented, together with the more prominent signs and symptoms that help in diagnosis. Cyanosis and dyspnea, though most reliable, may be absent in severe anoxia, and present even when oxygenation is adequate. Mental confusion and tachycardia are helpful and suggestive signs. The physician must realize that discrepancy between oxygen supply and demand is the cause of anoxia, and therapy should include not only methods of increasing supply, but also measures that improve transportation and decrease tissue demand.

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MEDICAL PROGRESS

ORAL SURGERY

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A NEW era of oral surgery has begun. In 1945 the American Society of Oral Surgeons appointed a seven-member committee and authorized them to form a certifying board and to conduct examinations for the certification of specialists in oral surgery. The American Board of Oral Surgery was incorporated under the laws of the State of Illinois in 1946 and subsequently approved by the Council on Dental Education of the American Dental Association. The Board conducted its first examinations in February, 1947. Among the qualifications[1] required of the applicant are the following:

> Graduation from a recognized dental school in the United States or Canada.
>
> Practice devoted exclusively to oral surgery for five years or more, including graduate training.
>
> Graduate study in oral surgery for a period of two years or more in a recognized graduate school or hospital, or under the auspices satisfactory to the Board. (This period of training shall cover the clinical and technical phases of oral surgery, and the basic sciences as they are related to oral surgery.)

It is the aim of the Board that societies representing the specialty of oral surgery, teaching institutions, hospitals and Government services shall require the certificate of the Board for admission to the special societies and for advancement in hospitals, teaching institutions and Government services.

History

It may be interesting to look over the shoulder of time and review how this specialty was developed. At the time of Morton (the dentist who first demonstrated publicly the use of ether for the relief of pain in dentistry and surgery), no surgical specialties had evolved. By reason of their particular skill and interest in treating certain diseases, some practitioners attracted patients who had heard of their special ability and soon were obliged to limit their practices to narrower fields. A striking example is Simon P. Hullihen, who made a wide reputation with operations for harelip, cleft palate and cancer of the jaws. A pioneer in this field and a foremost man of his time, he was given an honorary D.D.S. and an honorary M.D. degree.

James E. Garretson,[2] influenced by the brilliant achievements of Hullihen, published the first comprehensive American text on oral surgery in 1869. He recognized that there was an isolated field in surgery that had been neglected, being somewhere between medicine and dentistry. He pointed out in the preface of the second edition of his book published in 1873 that there is a great need for special training in this field, which, if taken in hand by medicine, suffers from want of special information and knowledge, and if taken care of by dentistry meets with disaster because of lack of surgical training and operative skill. A reviewer of Garretson's text stated: "This book fills a hitherto unoccupied place in the literature, and bridges the chasm which has separated dentistry from medicine."

The first recognition of the specialty of oral surgery came in 1869 when James E. Garretson was appointed to the Hospital of the University of Pennsylvania with the title of "oral surgeon."

Though the specialty did not receive a very cordial reception at first, Garretson and his contemporaries, who limited their practices to surgery of the mouth and jaws, continued to develop this specialty. These men had strong personalties, became great teachers

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and contributed many valuable publications to the literature. They included Thomas Fillibrown, Truman W. Brophy, Matthew W. Cryer, Thomas L. Gilmer, John S. Marshall and George Van Jugen Brown. The names of these men have been spoken in heartfelt gratitude by countless patients and their parents, because of the skillful correction of a variety of horrible deformities, or the repair of the ravages of cancer that had made these patients outcasts of society.

Oral surgery in the twentieth century became a recognized specialty of dentistry, included in the curriculum of all dental schools. That this surgical specialty was fostered and developed under the aegis of dentistry is natural when one considers that both the diagnosis and the treatment of oral disease require special knowledge of the anatomy and pathology of the teeth and jaws and that dentists are primarily concerned with the preservation and restoration of the proper functioning of the masticatory apparatus. Furthermore, medical schools have, in the past, shown very little interest in oral disease and have taken no responsibility for investigation and research to prevent such disease and maintain health and adequate function of the tissues involved.

Oral surgery has been defined by the American Board of Oral Surgery as the branch of dental practice that deals with the diagnosis, treatment, prescribing for or operating upon any disease, injury, malformation or deficiency of the human jaws or associated structures. The assignment of this field to dentistry in most states is backed by provisions of the dental law.[3] Thus, oral surgery is legalized and authenticated as a specialty of dentistry.

Graduate Training

A very important step in the development of oral surgery is the establishment of postgraduate courses by some of the leading dental schools. Waldron[4, 5] points out that acceptable programs for graduate training in oral surgery may show considerable variation in their plan of operation:

> Some schools offer a graduate degree at the conclusion of the training period, though this is no more essential in oral surgery than it is in the program of graduate training in surgery and its various specialties. The first year of the training period should include training in basic science and study of fundamentals of clinical oral surgery. The remaining years should be devoted almost entirely to clinical and operative oral surgery.
>
> Other schools, having accommodations for only a small number of students for the clinical work, may, through affiliations with other institutions, provide training under the guidance of accredited oral surgeons in various hospital centers.
>
> Training may be offered by certain hospitals and clinics not associated with universities but approved for graduate training in surgery.

The course offered by the Graduate School of Medicine of the University of Pennsylvania is a good example of the high ideals set by its sponsors. It offers, in the first year, graduate training in advanced regional anatomy, bacteriology, immunology, physiology, biochemistry, pharmacology and special pathology, with autopsy assignments and participation in clinicopathological conferences. In addition, courses are offered in principles of surgery, medical physical diagnosis, anesthesiology, roentgenologic diagnosis and therapy, and experience in the clinical laboratory. Similar courses of one year's duration are given by Minnesota, Northwestern and other schools. The first year is followed by two years of internship either in the institutions teaching hospital or in another approved hospital, where the head of the department is a diplomate of the Board of Oral Surgery. The importance of appointing well trained and able teachers to hospital staffs is therefore paramount. According to the chairman of the Committee on Hospital Training of the American Board of Oral Surgery, a field survey committee will be appointed to evaluate the various training services in oral surgery and to give recognition to institutions that conform to the Board's minimum standard requirements that will make a trainee eligible for examination for certification.

Recent Advances

The more recent past contains a number of milestones that mark distinct developments in the field of oral surgery. These are local anesthesia, the perfection of which made it possible to perform all kinds of minor operations painlessly in a dentist's office; the denouncement of septic dentistry, which was the result of the endeavor to save teeth at all costs — many of these teeth so assiduously treated in the past were found to be infected and presented a source of great danger to the patient's general health; the influence of World War I with its trench warfare, which caused facial wounds and shattered jaws in enormous numbers, making a great demand on the skill of the comparatively few trained men of that time; the new field of traumatic jaw surgery of the postwar period, when civilian accidents became more frequent because of the rapidly increasing use of automobiles and airplanes, and the speeding up of industrial machines; the discovery of a fertile field consisting of a variety of asymptomatic jaw lesions revealed by the popularization of roentgenologic examination by both the physician and the dentist as part of a general examination; and finally the great discovery of chemotherapy and the use of antibiotics, which altered many procedures and eliminated many

dangers from oral surgical operations performed in an infected region.

Anesthesiology

It should be noted that two of the most important anesthetic agents, which are still the most popular and safest means of producing surgical narcosis, have been discovered by dentists. In addition, special technics have been developed by the latter to relieve pain by means of anesthesia and analgesia, not only for oral surgical operations but also for general dental procedures.

Anesthesia in the Dental Office

Recently, the use of pentothal sodium, with or without nitrous oxide and oxygen, has been employed for short procedures by those who perform minor operations on ambulatory patients in offices.

The two most important topics in the use of general anesthetics are the question of anoxia, often resulting during the induction of nitrous oxide and oxygen anesthesia, and the question of the safety of giving general anesthetics, especially pentothal sodium, to ambulatory patients without adequate physical examination and preparation.

Nitrous oxide and oxygen. The effects of anoxia and hypoxia, which are frequently produced by incorrect technic of induction and administration of nitrous oxide anesthesia that has a very narrow margin of oxygenation, were described by Courville.[6] He pointed out that damage to the cerebral cortex is the penalty for insufficient oxygenation. It should be remembered, according to Kaye,[7] that absence of cyanosis does not necessarily mean that no anoxemia is present. In anemic patients gross and dangerous suboxygenation may exist without signs of cyanosis since the oxygen-carrying capacity of the blood is reduced. In thyrotoxic subjects, too, the metabolic rate may be so high that oxygen lack exists even when the oxygen supply maintains normal color. Kaye points out that the absence of cyanosis is no guarantee of safety, and careful attention must be paid to assuring adequate oxygen administration in such cases. Schreiber,[8] who reported 9 cases of severe cerebral damage and death, showed that anoxia may be brought about by the improper administration of any anesthetic. In 5 of his cases brain damage followed spinal anesthesia, and in one an asphyxial episode resulted in irreparable personality change when a tonsillectomy was performed under local anesthesia with a 0.5 per cent procaine solution. In 4 cases of prolonged anoxia, reported by Steegmann,[9] in which brain damage was caused in 2, nitrous oxide was used. In the other 2 cases, avertin and cyclopropane were employed.

Seldin[10] defends the use of nitrous oxide and oxygen and points out that there is no necessity for severe or prolonged anoxia to occur when nitrous oxide is correctly administered. His tabulation of 14,790 administrations shows that most patients will accept a surprisingly high percentage of oxygen with nitrous oxide without its interfering with maintenance of the third stage of anesthesia. In 85 per cent of the patients, anesthesia could be maintained with a minimum of 20 per cent oxygen. He states that the formula of 7 per cent oxygen and 93 per cent nitrous oxide used in the past is definitely wrong. McQuiston, Cullen and Cook[11] showed that any appreciable reduction of oxygen below 20 per cent may become extremely dangerous to the patient and that a reduction of oxygen below 12 or 13 per cent presents a great risk. If a patient cannot be adequately anesthetized with such a mixture, Arrowood[12] recommends that the nitrous oxide be supplemented with a more potent agent, such as ether, vinethene or pentothal.

The advantage of proper premedication has been stressed by Curran[13] and Wiggin,[14] as well as Arrowood.[12] The first recommends for ambulatory patients the short-acting seconal and nembutal, whereas Macintosh and Pratt[15] suggest phenobarbital, 30 mg. (½ gr.) the night before the operation, 15 mg. (¼ gr.) at breakfast time and 15 mg. an hour before operation. Atropine, 0.4 mg. (1/150 gr.), Arrowood[12] points out, is very useful for drying up secretions that may hinder respiration.

Nasoendopharyngeal intubation is recommended by Cooper and Hill[16] to avoid obstruction of the airway by retraction of the tongue, or by mucus, blood, pus or fractured teeth. A pack should be placed back into the mouth to avoid the aspiration of this material.

The need of a physical examination has been discussed by many writers. Macintosh and Pratt[15] state, "We believe that a patient who does not volunteer a history of illness, and who is able to walk into the dental surgery, can be presumed fit enough to submit to a short dental anesthesia." Arrowood[12] points out that such an attitude courts disaster. Most of the modern writers on the subject agree. Arrowood recommends that a brief medical history be taken, and the questions asked should be planned to include the possibility of such maladies as allergic conditions, heart disease, especially of the myocardial type, and chronic pulmonary disease, especially with reference to vital capacity. Better still is a consultation with the patient's physician. This may yield important information regarding conditions, of which the patient is unaware, that may contraindicate the use of certain methods. Foldes[17] points out that the history and physical examination should, in certain cases, be supplemented by various laboratory studies, and that special attention should be given patients with conditions that are adversely affected by the biochemical changes produced by the various anesthetic agents. Patients with diseases of the circulatory or respiratory systems and those with thyroid disease, kidney disease, liver disease, diabetes, allergic condi-

tions, blood dyscrasias and so forth should be hospitalized.

In response to a questionnaire sent to the members of the American Society of Oral Surgeons, Seldin[10] reports that 207 who replied had, during the preceding five years, administered approximately 2,429,148 anesthetics in their offices. Fifteen deaths were reported in this series. Nine deaths occurred from nitrous oxide for the following reasons: 2 patients had cardiac disease; 3 died of unknown cause; 1 patient with hypertension died eleven days later; 1 jumped out of the window during induction; 1 died of necrosis of the spinal cord; 1 died from "status lymphaticus" and sarcoma; 4 patients with cardiac diseases died during sodium pentothal anesthesia; 1 death occurred with novocain and pontocaine; and 1 additional death occurred under ethylene. Seven personality changes were reported; 6 were reversible, and 1 irreversible. According to this report, the death rate in these office administrations of anesthetic was 1:161,943, as compared with 1:1000 during administration in hospitals as reported by Waters and Gillespie.[18] It should be remembered, however, that the main reason for the comparative infrequency of fatal cases in office administration is the short duration of most operations performed on ambulatory patients. The comparative safety of a short anesthesia has been recognized by many writers. Macintosh and Pratt[15] state that no operation of more than ten minutes' duration should be undertaken in the dental office. Gillespie[19] places the limit at fifteen minutes. Since Chapman, Arrowood and Beecher[20] have demonstrated that it takes ten or fifteen minutes for full saturation with a given mixture of nitrous oxide, oxygen deprivation during these short procedures is not often sufficiently severe to be fatal, according to Arrowood.[12]

To facilitate the induction of nitrous oxide and oxygen anesthesia, especially in obstreperous patients, or to achieve a deeper anesthesia without decreasing the percentage of oxygen, the admixture of trichlorethylene,[21, 22] vinethene[23] and ethyl ether is recommended, the last being the safest means of fortifying nitrous oxide anesthesia.[24] Premedication of ambulatory patients treated in the office is desirable but not practical since the delayed action of some of these drugs will endanger the patient's safety, especially if he is driving an automobile. Short-acting barbiturates are recommended such as seconal, nembutal and evicyl if the patient is kept under observation postoperatively and is taken home by an attendant.[10, 13, 24]

Pentothal sodium. Intravenous anesthesia with pentothal sodium has been used in dentistry and oral surgery with increasing frequency and enthusiasm in recent years. Bullard,[25] in 1940, reported on 946 cases of anesthesia for exodontia and oral surgery with pentothal sodium. Olson[26] discussed a series of 8203 operations and stated that he preferred pentothal to nitrous oxide and oxygen because of the almost total absence of the excitement stage and of postoperative nausea and vomiting. Other enthusiasts who advise its use for ambulatory patients are Archer[27] and Robert and Brown,[28] who recommend that pentothal be supplemented with oxygen.

Still others believe that it should be used as a synergist only. Seldin[10] states, "This drug does not lend itself to unrestricted use as a principal anesthetic in prolonged oral surgery in the office because it is potentially dangerous if infection of the floor of the mouth or cellulitis of the neck is present." He recommends it for selected cases in combination with nitrous oxide and oxygen.

Many anesthesiologists approve of these methods if they are executed by a well trained person and if facilities are at hand to treat emergencies. Arrowood[12] believes that pentothal should be administered by a professional anesthetist only and not by the dentist himself. She points out that adequate premedication with atropine by depressing the parasympathetic system helps to protect against irritation of the larynx. Etsten and Himwich[29] state that the reflex irritability is markedly increased under light, and is not completely abolished even in deep pentothal anesthesia. Painful stimuli, especially from the region of the neck, may produce severe laryngeal spasm because the vagus nerve is not sufficiently depressed during this type of anesthesia to cause disappearance of the pharyngeal reflexes.[30] Spastic closure of the glottis, with extreme cyanosis, may result. Hubbell,[31, 32] however, who reported on 13,000 administrations, states that no complete laryngospasm occurred in his series of cases. Facilities for tracheal intubation and efficient suction should be immediately available if pentothal sodium is used. The importance of complete equipment is stressed by all the writers, but is especially emphasized by those who make anesthesia a specialty. Foldes[17] states that the immediate availability of equipment necessary for resuscitation such as a suction apparatus, a laryngoscope and a variety of endotracheal tubes should always be on hand. There should also be equipment for the administration of oxygen under positive pressure and a sufficient number of competent assistants to aid in case of emergency.[28]

According to Everson[33] pentothal anesthesia is contraindicated in patients with marked anemia, because of reduced oxygen-carrying capacity, hypertension (systolic blood pressure of 200 or more), hypotension (systolic blood pressure of 90 or less), since pentothal lowers the blood pressure by 8 to 40 per cent, impairment of respiratory function as caused by pulmonary secretions or metastatic disease and ankylosis of the jaw, as well as in very old and very young patients and those with coronary-artery disease, who should receive 100 per cent oxygen if this type of anesthesia is used.

Local anesthesia. The development of local anesthesia, especially conductive anesthesia (nerve block), with the discovery of novocain, has furnished the dentist a safe method by which he can perform operations in his office without resorting to general anesthesia and acting as his own anesthetist, avoiding the need of specially trained personnel and elaborate equipment. Unfortunately, this method made the undertaking of minor surgical procedures so easy from the anesthesia aspect that many inadequately trained dentists proclaimed themselves specialists in oral surgery.[34]

However, local anesthesia has given the well trained oral surgeon an opportunity to perform dentoalveolar surgery safely on ambulatory patients without the preparation that is required for a general anesthetic. Performing minor procedures in the office under local anesthesia and using general anesthesia at a hospital for the more extensive operations, employing an expert anesthesiologist, is an ideal arrangement, though even with local anesthesia poor-risk patients should be hospitalized.[35] Greene[36] writes "regional anesthesia which is the method of choice should be urged on every patient in preference to general anesthesia if the patient is suitable for surgery in a conscious state."

The usual preparations to produce local anesthesia today contain procaine and epinephrine. More recently, monocaine with epinephrine has been recommended.[37] The same results are obtained with a 1 per cent solution of monocaine as with a 2 per cent solution of procaine.[38] In addition, monocaine has a synergistic action with epinephrine, and, therefore, smaller concentrations of this vasoconstrictor may be used (1:75000) than are required with procaine to which is added epinephrine 1:50000.

In oral surgery, epinephrine is considered indispensable. It aids in maintaining anesthesia long enough for the operation to be performed painlessly, and it produces hemostasis, which improves visibility of the field of operation. Many of the undesirable by-effects are due to the epinephrine rather than the procaine or monocaine since the use of epinephrine stimulates the myocardium, accelerates the heart rate and produces a rise in blood pressure. These have serious consequences in patients with cardiac complications[39] such as angina pectoris, coronary occlusion and severe hypertension or arteriosclerosis.

The combination of antibiotic agents and local anesthetic was recommended by Lundy and Osterberg,[40] who recommend the admixture of 250 units of penicillin per cubic centimeter of the anesthetic solution when it is injected into an infected region. They proved that penicillin does not interfere with anesthesia. Another suggestion was made by Copen,[41] who advised premedication by comedication to overcome states of anxiety and fear. The inclusion of 25 mg. of demerol hydrochloride with monocaine and epinephrine is recommended, 12.5 mg. for children. Others prefer premedication with seconal or pentobarbital sodium an hour before the administration.[14]

Anesthesia for Oral Surgery in the Hospital

It is agreed by almost everyone that when a general anesthetic is necessary for a prolonged oral surgical operation, the patient should be hospitalized. I heartily concur with this recommendation. The obvious advantages are: more careful physical checkup; preoperative correction of general disease; rest and control of food intake and hydration; proper premedication and preparation; maintenance of optimal conditions for the patient's metabolism in the postoperative period; and excellent postoperative general care and medication, not to speak of the proper use of antibiotics for the prevention or treatment of infections.

Endotracheal nitrous oxide, oxygen and ether anesthesia is by far the safest method for oral surgical operations.[12, 42] The Magill tube inserted through the nose leaves the oral cavity free, and the throat can be adequately packed to prevent aspiration of foreign material. Intubation minimizes leakage of the anesthetic agents. This type of anesthesia was highly approved of by Hunter[43, 44] for maxillofacial surgery in the British Army in World War II.

Pentothal sodium with endotracheal nitrous oxide and oxygen is believed to be the anesthesia of choice by others.[14, 45-47] However, Wilson and Hilmore[47] state, "The use of pentothal sodium alone is highly dangerous." They recommend "balanced anesthesia" of pentothal with nitrous oxide and oxygen. The induction is pleasant, less pentothal is required, the recovery is quicker, and there is complete freedom from straining and vomiting, which is important if intermaxillary fixation is used. Elliot and Arrowood[48] point out the advantages of pentothal sodium with tracheal intubation if diathermy procedures or electrocoagulation are contemplated in and around the head. Schultz and Guralnick,[49] besides combining nitrous oxide and oxygen with pentothal, believe that the addition of curare has advantages for more complicated cases in which maximum relaxation is essential during maintenance of a light plane of anesthesia.

The combination of continuous pentothal sodium anesthesia with nerve block has been recommended by Thompson,[50] who reports on 100 consecutive cases. He points out that the method has many advantages, the most important of which is safety, since the amount of pentothal to carry the patient through the operation can be reduced to a minimum.

The combination of pentothal sodium with endotracheal nitrous oxide, oxygen and local anesthesia I find to be the ideal method when intravenous anesthesia is indicated. Its use with nitrous oxide,

oxygen and ether also may be recommended. Sodium pentothal is a vasodilator,[42] and when it is combined with local anesthesia, bleeding can be controlled. Nerve block as well as infiltration will, in addition, allow the anesthetist to carry the patient through the operation with as little pentothal as possible.

(To be continued)

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Correction. In the article by Dr. Stanley E. Bradley entitled "Variations in Hepatic Blood Flow in Man during Health and Disease," which appeared in the March 24 issue of the *Journal*, the word "excretion" should be changed to "extraction" in the legend of Figure 5 and wherever it occurs in the text.

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

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CASE 35171

PRESENTATION OF CASE

A thirty-year-old clarinet player entered the hospital because of epigastric pain and vomiting.

Twenty months before admission the patient developed what he called "indigestion and dyspepsia." There was no vomiting, food intolerance or melena. These symptoms persisted for six to eight months and then ceased spontaneously except for sporadic attacks. Three months previous to admission the symptoms became severe. Six weeks before entry a Graham test at another hospital was negative. A gastrointestinal series showed marked dilatation of the descending and proximal transverse duodenum. There was an area of constriction in the mid-transverse duodenum that extended for a distance of about 8 cm. to the ligament of Treitz. The jejunum distally was normal. After four hours there was approximately 50 per cent retention of barium proximal to the constriction. Operation was advised but was refused. Epigastric pain and "heartburn" became severe. There was almost nightly vomiting — at 2 to 3 a.m. — of bile-stained material, which relieved the pain. He developed constipation but no melena. Fried or fatty foods promptly caused vomiting so that he restricted his diet to boiled foods, especially eggs and cereals.

The past and family histories were noncontributory.

Physical examination showed a short, obese man in no distress. The heart and lungs were normal. The abdomen was not tender, and there were no masses or tenderness. There was a maculopapular dermatitis confined to the region of the right axilla.

The temperature, pulse and respirations were normal. The blood pressure was 120 systolic, 80 diastolic.

The hemoglobin was 14 gm. The white-cell count was 7700. The urine sediment contained an occasional pus cell. The serum protein was 6.5 gm., the chloride 97 milliequiv. per liter and the nonprotein nitrogen 23 mg. per 100 cc. A gastric analysis showed no free hydrochloric acid in the fasting specimen, 5 units after alcoholic test meal and 44 units after histamine. A gastrointestinal series showed the duodenum to be rather severely dilated from the pylorus to about the junction of the second and third portions of the duodenum. At that point the barium column presented a rounded, blunted extremity, with marked delay in the passage of barium through this region. There was considerable reflux, and back-and-forth motion occurred between the stomach and duodenum. After some delay the barium entered the third portion of the duodenum, outlining a severely narrow segment of somewhat irregular caliber about 7 cm. long. Small projections suggested areas of ulceration. The distal portion of the narrowed area was of greater caliber than the remainder. The rest of the small bowel was not unusual. After four hours a large amount of barium was present in the dilated duodenum.

On the third hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. CHESTER M. JONES: On the third hospital day an operation was performed, which probably should have been done some weeks before. The obvious thing is that there was partial obstruction of the duodenum. That was obvious from the two sets of x-ray studies, and there is no evidence of any other disease, at least, on the basis of history, physical findings, laboratory data or x-ray examination. We are told that a cholecystogram was normal, and the x-ray film taken six weeks before admission to this hospital, in general, was entirely comparable to that taken a day or so after admission here. It would be interesting to know whether there was any occult blood in the stools. There is no statement about that. The patient had no anemia so I assume that he had not been bleeding to any great degree, but it would be interesting to know if there was enough erosion to cause occult blood.

DR. BENJAMIN CASTLEMAN: No stool examination is recorded.

DR. JONES: He was here three days, and the x-ray studies were done on the first and second days. I do not believe there would have been a stool examination. The symptoms were those of partial obstruction. As far as I can see, the question when he came in was primarily one of making a decision — namely, to operate or not to operate. Some partial obstruction was demonstrated in the duodenum, and operation seemed the only logical approach to the problem. That is the only important part of the picture. Exact diagnosis is interesting, but whatever diagnosis had been entertained preoperatively would have made very little difference in what one decided to do.

Regarding the possibilities underlying this partial obstruction, I am going to make what I call an intelligent guess, I hope. But it seems to me that the x-ray description can do nothing more than suggest certain possibilities. He may have had pri-

mary adenocarcinoma of the second or third portion of the duodenum, which is rare but certainly occurs. We have all seen an occasional example of that disease. He may have had localized lymphoma of some sort, involving the same area, and a lymphoma at times is characterized by sharp localization of the tumor with infiltration of a given area of the gastrointestinal tract, but with no evidence of disease anywhere else.

This picture, to my mind, is not that of a duodenal ulcer. Peptic ulcers that are perfectly benign can occur in the third portion of the duodenum. They are not common, but many of them have been recognized — some at operation, and some by careful x-ray examination — but they do not give the x-ray picture that is described here, in my experience.

Benign tumor, of course, can involve this portion of the duodenum, but the appearance described here does not suggest benign tumor to me. A very remote possibility, as far as I can see, is that of localized enteritis. The usual site of this disease is the terminal ileum; occasionally, it involves the jejunum rather than the ileum, and rarely is it sharply localized in the upper small bowel. This is extremely rare but can happen and might involve the area considered as the duodenum. I do not believe it was regional enteritis, so-called, but I suppose that is a remote possibility. It is also possible that it was one of the various granulomatous processes we have to think of from time to time, but I have no reason to do any more than mention the possibility.

I do not know that there is any connection between the clarinet playing and the symptoms. Perhaps it was a fortuitous affair rather than an occupational hazard.

I would like to look at the x-ray films before finally trying to decide in my own mind what the diagnostic possibility is.

There is obviously enlargement of the duodenum.

Dr. James J. McCort: We have the films made on admission to this hospital. The esophagus and stomach do not show any abnormality. Beginning at the pylorus the duodenum shows a considerable widening all the way around to the junction of the third and fourth portions. From that point on the lumen shows severe narrowing for a distance of 0.7 cm. The constriction is gradual so that it is somewhat funnel shaped. A definite shelf defect cannot be made out. Within the narrowed segment a normal mucosal pattern is not seen, and there are fine serrations that indicate small ulcerations. The film taken three hours after the barium was administered shows considerable barium remaining in the dilated proximal two thirds of the duodenum.

Dr. Jones: These two spot films are the most important ones, are they not?

Dr. McCort: Yes.

Dr. Jones: I think the only thing to do is to go out on the extreme end of the limb. I think the patient had an adenocarcinoma of the duodenum, with a secondary inflammatory process; I think it was not duodenal ulcer, and I believe it was not lymphoma. I am not familiar with the roentgenologic picture of lymphoma. I see no reason for thinking he had it except as a possibility to be included in differential diagnosis.

Dr. McCort: Does the absence of a shelf have any significance?

Dr. Jones: Do you mean to imply that if he had a shelf, you would be more interested in the diagnosis of cancer? I would go with that. The question that I cannot answer is how frequently one can show a shelf with a cancer. I do not know that.

Dr. McCort: I think it is frequently found.

Dr. Jones: I am sure of that. But is it in half, two thirds or a quarter of the cases?

Dr. McCort: I would say a high percentage.

Dr. Jones: In other words, you are putting a little pressure on me to say that this was an inflammatory process. The presence of ulceration would fit in with that idea. I should say that ulcer was a possibility here, and against that idea is the complete absence of anything that can be called a focal lesion. I have already said adenocarcinoma of the duodenojejunal junction. I might as well stick to it. There was no disease anywhere else in the adjacent portion as far as I can find. It was localized, and the important thing was to take it out. I believe a surgical exploration is the only reasonable approach. If this was a jejunitis or duodenojejunitis, an inflammatory process per se, it has to be determined by biopsy. And I think biopsy of living tissue has to be made on this to establish finally what should be done. I am willing to admit that it was perhaps an inflammatory process, but I am not good enough to make the diagnosis.

Dr. Richard H. Sweet: There are two questions I would like to ask Dr. Jones. It looks to me from the x-ray studies here as if the lesion was actually in the jejunum and not in the duodenum. Would that influence you in favor of a diagnosis of regional enteritis or some such inflammatory lesion rather than a malignant neoplasm?

Dr. Jones: Yes, I think so; but as the x-ray description was given it was stated that it was in the third and fourth portions of the duodenum.

Dr. Sweet: Yes, but it looks like the jejunum to me.

Dr. McCort: I cannot answer that exactly. I think it is on the proximal side of the ligament of Treitz.

Dr. Sweet: I would be surprised if it is.

Dr. Gordon A. Donaldson: Dr. Jones should be commended for "sticking his neck out" before seeing the x-ray films. I have the impression that after he actually saw them he thought of hedging a little bit.

Dr. Jones: I left it "on the end of the limb."

Dr. Donaldson: This was a very interesting and unusual problem. The record is misleading in that

one might picture the patient as being quite depleted. As a matter of fact, he was a healthy, slightly obese, well nourished young man. He had had three sets of radiologic studies, but they were never able to demonstrate the involved area here. It was not until he got to the Baker Memorial that it was possible to displace the stomach upward and the small bowel laterally so that this area showed up. The important point that Dr. Jones brought out was that he had to be explored for duodenal ob-

FIGURE 1.

struction. I shall simply point out that at exploration Dr. Allen found this mass to be more extensive than shown by x-ray examination. It extended for 10 cm. into the jejunum and 10 cm. into the duodenum, centering at the ligament of Treitz. We thought first of carcinoma and rather than any sidetracking procedure, a resection and duodenojejunostomy posterior to the transverse colon were done. Examination of the remainder of the small bowel revealed it to be normal down to the terminal ileum.

CLINICAL DIAGNOSIS

Regional enteritis.

DR. JONES'S DIAGNOSIS

Adenocarcinoma of duodenojejunal junction.

ANATOMICAL DIAGNOSIS

Regional enteritis of duodenum.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: This is a portion of the resected specimen showing the lesion at one end (Fig. 1). I do not think it is 20 cm. in length. Allowing for some contraction after removal, I do not believe the entire lesion measures more than 10 cm. It appears to be entirely within the duodenum. It will be noticed that the wall is very thick and edematous, and the mucosa in the lesion is ulcerated in several places. The intervening mucosa is raised in verrucous formation. The appearance in gross corresponds to what we see in the ileum in regional enteritis. Microscopically, in the regions of the ulcerations there is much purulent exudate. Deeper in the wall is granulation tissue and a more chronic inflammatory reaction. The nerves in the wall of the bowel seemed very prominent with the infiltrate surrounding them, and I wonder if the pain may not in some way have been related to the severe infiltration around the nerves in the muscle layer. The serosa also shows an inflammatory reaction. As far as I can make out, this is a nonspecific reaction. There are a few areas that show epithelioid cells and an occasional giant cell, which is seen in regional enteritis. I do not believe it is tuberculosis. We have some material in a guinea pig, but it is still too early to find out. If this was regional enteritis, it is the first time we have seen it localized to the duodenum. I believe we have had one case in which the disease spread from some other region to the duodenum. The regional lymph nodes were chronically inflamed and did not show any of the granulomas sometimes seen in regional enteritis. I suppose this film demonstrates the string sign seen in regional enteritis.

DR. JONES: Yes, but that could be an infiltrating process of any sort, and if it were a lymphoma, ulceration could still occur. As I have already stated, a few cases have been reported of enteritis involving this area, but it is most unusual. Resection, of course, was the obvious move.

DR. CASTLEMAN: The patient was discharged home, apparently well.

CASE 35172

PRESENTATION OF CASE

A thirteen-year-old boy was admitted to the hospital because of stiffness in the left knee.

Four months before admission the patient injured the medial aspect of the left knee while playing football. There was no swelling or ecchymosis, and the injury was not severe enough to cause him to leave the game. One month later he noted the onset of stiffness and inability to extend the leg fully. There was no pain at rest or at night. Pain located over the left medial epicondyle became present when he first started walking but after he had gone 100 yards or so it disappeared.

The past and family histories were essentially noncontributory.

Physical examination revealed a well developed and well nourished boy in whom positive findings were limited to the left lower extremity. There were definite tenderness and moderate swelling over the medial epicondyle. There were no palpable bony masses. The joint line was not tender, and there was no fluid. Twenty centimeters above the patella, the left thigh measured 33 cm. and the right 36 cm. in circumference. The left leg showed a permanent flexion contracture of 25°, with further flexion to 140°. There was full range of flexion 0° to 150° on the right.

The temperature, pulse and respirations were normal.

The urine was normal. The blood hemoglobin was 15.5 gm.; the white-cell count was 7000, with 66 per cent neutrophils. The blood cholesterol was 197 mg., the calcium 9.9 mg., the phosphorus 4.9 mg., and the phosphatase 5.9 units per 100 cc. The sedimentation rate was 19 mm. per hour. The blood Hinton test was negative, as was a skin tuberculin test.

A roentgenogram of the left knee revealed an area of rarefaction, measuring 1.3 by 3.0 cm., in the region of the medial aspect of the femoral epiphysis and apparently crossing the epiphyseal line. Around the lesion was a sclerotic margin. The joint space appeared intact, and the articular surfaces were smooth. The lesion appeared to lie somewhat posteriorly. Roentgenograms of the spine, pelvis and upper extremities were normal. A subsequent scanogram confirmed the previous impression of a lesion in the medial aspect of the distal end of the femur with dissolution of bone on both sides of the epiphyseal line.

On the seventh hospital day an operation was performed.

Differential Diagnosis

Dr. Grantley W. Taylor: This patient presented an essentially negative examination except for what appeared to be a defect at the distal end of the femur. It seems as if the radiologist logically should present it instead of me, but I will be glad to look at the pictures and hazard a guess.

Dr. Stanley M. Wyman: The lesion, as described, lies in the medial portion of the distal end of the femur in the epiphysis and crosses very slightly the epiphyseal line. In the lateral aspect there is slight sclerosis about the margins of the defect, and the defect is sharply defined, although slightly irregular in contour. The oblique view shows the defect crossing the epiphyseal line somewhat better. There is no evidence of periosteal reaction. There is a soft-tissue mass.

The bones are not decalcified, and no other evidence of bone disease is apparent.

Dr. Taylor: We can be as elaborate or simple as we choose to be. We can start off by running through the infections — Brodie's abscess, osteomyelitis — or gumma. There are reasons against all these diagnoses, which I do not need to go into. The boy was not sick and never had been. There was no apparent disturbance of any vital functions, and the blood Hinton test was negative. The more recently described, perhaps infectious, process, called eosinophilic granuloma, should be alluded to just long enough to say that I do not know much about the disease. It is discovered from time to time, but chiefly by the pathologist. We operate on one of these lesions hoping to find out what it is, and the pathologist says that it is an eosinophilic granuloma. I do not know that it has characteristics in the radiogram that would do more than possibly raise that diagnosis. We have the cystic lesions of bone, — bone cysts occurring in the younger age groups in the shaft, in the metaphyses of the shaft, near the epiphyseal line, — and as the patients grow older the lesion moves closer to the middle of the bone, and the epiphysis grows away from it. We have such cysts as are present in parathyroid disease or fibrous dysplasia (Albright's syndrome). This bears no relation to that. Specific films of the other bones were taken to find out whether there was disease in the bones elsewhere, and they were normal. Other conditions that we ought to consider are xanthoma and Gaucher's disease. We need not do more than allude to them and pass them by.

We come very quickly to the conclusion that this must have been a tumor, and when one arrives at that point the decision must be made whether it was benign or malignant and, if malignant, whether primary in the femur or metastatic. The history is brief, but the history in a bone tumor, a large part of it, is frequently silent. It is not until symptoms begin to develop that one can date the onset. This boy had minor trauma, which drew attention to the knee, but the tumor may have existed for a long time before the trauma. There was impairment of function sufficient to cause atrophy of the thigh muscles but not bone atrophy. There is a little thickening in the soft tissues adjacent to the lesion, suggesting that perhaps with disturbed mechanics there was a little edema in a periosteal structure but no effusion in the joint. Boys of this age do not often have metastatic neoplasm. If they do, there is likely to be a primary focus, which betrays itself after careful investigation. Finally, metastatic disease would not present a picture comparable to this in that this bone lesion, whatever it was, had progressed in orderly fashion, with a zone of concentration of bone, suggesting an encapsulating process. That zone of encapsulation would work very much against a primary malignant lesion of the bone, such as osteogenic sarcoma, Ewing's tumor or lymphoma.

It seems to me that we come rapidly to the conclusion that this was a benign tumor involving this part of the bone, and then we can recapitulate the common types of bone tumor. One of the most re-

cent accretions to this category is osteoid osteoma. I do not recall ever seeing that condition in the epiphyses. Characteristically, there is a punched-out area of bone, with some condensation around it, and invariably a careful search discloses a small condensation in the center, a little grainlike focus that is apparently the crux of the problem and the removal of which is accompanied by relief of symptoms. Benign cysts I referred to earlier as being in the shaft of the bone. The giant-cell tumor, it seems to me, must be seriously considered. Giant-cell tumors, arranged in relation to the epiphyses of the long bone, grow over into all the nooks and crannies of the joint surface, leaving a thin rim of bone. They grow by expansion and usually preserve an intact overlying periosteum for a long period. The x-ray appearance of giant-cell tumor is apt to show more trabeculation, which helps to identify it in the roentgenogram. Chondromas, not the osteochondromatosis but simple chondromas, are likely to occur in relation to cartilaginous plate, such as epiphyseal plate. They are much more common in the small bones of the hands and feet, and occasionally occur in the ends of the long bones, and also in the ribs and in the vertebras. It seems to me that we have to consider that seriously. The characteristic arrangement is apt to show coarse trabeculation of bone as supporting it. I have never seen hemangiomas in this location, which does not mean they may not occur. They are much more common in the small or compact bones like the vertebras. The growth is progressive and expansive and does not, as a rule, start a zone of protective reaction ahead of the tumor. Finally, the nonossifying fibroma must be considered — fibroma of the bone, with which this picture is entirely consistent. I think, from the point of view of the surgeon, one arrives at the conclusion that this was a benign tumor of bone and leaves to his colleague, the pathologist, the decision exactly what sort of tumor it is. Sometimes the radiologists will tell us unequivocally that this is thus and so — a tumor. I believe that is an esoteric art that they acquire and are incapable of communicating to me, although I strive to follow them by implication and inference from the films. I think this was a benign tumor of bone, probably fibroma or chondroma.

DR. TRACY B. MALLORY: Have you any comment on the x-ray films, Dr. Wyman?

DR. WYMAN: I should say that Dr. Taylor has done a great deal better than his x-ray colleagues in this diagnosis. We thought of chronic infection, benign tumor and eosinophilic granuloma.

CLINICAL DIAGNOSIS

Bone cyst.

DR. TAYLOR'S DIAGNOSIS

Benign tumor of bone: fibroma or chondroma.

ANATOMICAL DIAGNOSIS

Benign chondroblastoma of femur.

PATHOLOGICAL DISCUSSION

DR. MALLORY: I think this is an example of a type of tumor that was first clearly recognized by Dr. Codman[1] of the staff of this hospital, some eighteen years ago, which he called at that time chondromatous giant-cell tumor of bone and noted that it most commonly occurred in the head of the humerus. He was able to discover 8 cases in that area, many of which had been erroneously described as osteogenic sarcoma. More recently, Jaffe and Lichtenstein[2] have found that tumors of this type occur in other bones besides the humerus, perhaps almost with equal frequency. They disagreed with Dr. Codman in his interpretation that this was an atypical form of giant-cell tumor and gave it the name of benign chondroblastoma of bone. They pointed out a number of characteristic features: that it is always seen in young persons, usually between thirteen and twenty years of age — this boy just falls in at the lower end of their age scale — that there is frequently, though not invariably, a history of trauma as there was here, and that the lesion is always found in the epiphysis, very close to the epiphyseal line, although in about a quarter of the cases it crosses the epiphyseal line as this one did. From the x-ray point of view it is characteristically surrounded by a dense line of condensation of bone, as in the case under discussion. Histologically, the tumor simulates benign giant-cell tumor, but there are always certain atypical features: one is that the number of large giant cells is frequently slight compared with the typical giant-cell tumor; that the tumor cells tend to lay down a slightly basophilic, intercellular matrix, which faintly suggests cartilage. Calcification develops focally in this matrix, and the neighboring tumor cells become necrotic. Finally, the necrotic focus heals by organization with a peculiar type of hyaline fibrous tissue, which again resembles poorly formed cartilage. This particular tumor shows all these various features. Whether or not Jaffe and Lichtenstein are correct in their interpretation of the lesion as a chondroblastoma, they have described a clinical and pathological entity. This case is beyond doubt a characteristic example.

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"CAULDRON BUBBLE"

Proposed legislation bearing on the extension of medical services has been augmented by the introduction in Congress on March 30 of S1456, the "Voluntary Health Insurance Bill." This bill, which was introduced by Senator Lister Hill of Alabama, co-author of the familiar Hill–Burton Act, bore the additional signatures of Senators George D. Aiken of Vermont, O'Conor of Maryland, Withers of Kentucky and Morse of Oregon.

Patterned to some degree after the Hospital Survey and Construction Act, the Voluntary Health Insurance Bill seeks to employ the same methods in financing hospital and medical care that the Hill–Burton Act uses in the construction of new hospitals and health centers.

The purpose of the bill is "to make a high quality of hospital and medical care available to all persons in each state by (a) strengthening and co-ordinating existing health resources within the State, (b) encouraging and stimulating voluntary enrollment in prepayment plans for hospital and medical care, with emphasis on employer participation and on making such protection available to persons in rural areas, and (c) providing protection to persons financially unable to pay all or part of subscription charges for prepayment of hospital and medical care." The services to be rendered are to be furnished in a hospital, not in excess of sixty days in any year.

The financing of the Plan would be similar to that of the Hospital Survey and Construction Act of 1946, through federal grants and a variable percentage of funds from state and local sources, giving a greater percentage of aid to low-income states.

It is important to note that the program would be entirely in the hands of the state agency acting in consultation with a state hospital and medical-care council, and regional hospital and medical-care authorities within the state. This method of administration is already in effect in many states to carry out the provisions of the Hill–Burton Act.

Persons unable to pay the costs of medical and hospital care would have it made available through Government-supported membership in nonprofit, prepayment health-insurance programs. Since these recipients would not be identified as the beneficiaries of governmental assistance, their anonymity would be safeguarded; they would be spared the "indignity of a means test."

The Voluntary Health Insurance Bill, whether or not it is enacted, represents a relatively conservative step down the road of socialization to which the whole world is committed. Such a step would have been bitterly opposed by all conservative elements ten years ago, and with reason. Today it is viewed with comparative equanimity. The times, the customs, the viewpoints of people change. The attitude of critics who today decry the conservatism of a decade ago shows in itself a reluctance to recognize progress in other camps than their own.

Dr. Channing Frothingham, of Boston, chairman of the Committee for the Nation's Health and

a former president of the Massachusetts Medical Society, calls the Hill bill, according to *Washington Report on the Medical Sciences*, "either a fraud on the American people or a proposal to appropriate billions of dollars out of the Treasury without any assurance that it will provide adequate medical care."

Even as this issue of the *Journal* goes to press, Senators Taft of Ohio, Smith of New Jersey and Donnell of Missouri have introduced their own national health bill. This also calls for federal aid to states, instead of compulsory insurance.

It is anticipated that the next few months will witness considerable controversy over the Nation's health.

BOSTON LYING-IN HOSPITAL

THE function of the voluntary teaching hospital in making available special services that usually accompany the more recent advances in medical knowledge and technics has always been considered one of the major contributions that large medical centers can make to improve medical care. In these times when there is a great desire to change the mode of medical practice, it is well to examine the extent to which the teaching hospital is able to contribute to the medical services of a community, for one might question whether these services have been completely utilized under the present system. The availability of the services is often not adequately appreciated by either the practicing physicians or the neighboring hospitals. This idea is especially prevalent regarding the specialty hospital, for in the minds of the practicing physicians these institutions are capable of rendering only one type of medical service. Frequently, such attitudes are due to the fact that the teaching hospitals have not informed the medical community of the character and scope of the services that they have to offer.

A more co-operative effort between institutions in attempting to solve complicated medical problems should produce a wider distribution of medical care and should provide additional opportunity for the accumulation and dissemination of medical knowledge. The branch of medicine concerned with maternal and child health affords an excellent opportunity for such a co-operative effort.

During the past two decades a gratifying reduction in maternal mortality and morbidity has occurred, with a parallel improvement in the mortality rate in the newborn. This result has been due in large measure to an increase in hospital facilities and in trained personnel. This has been reflected by an improved quality of prenatal care and the provision of the proper hospital surroundings to cope with the complicated obstetric emergency. These services must continue. However, a further reduction of maternal and fetal mortality and morbidity will depend on a more careful screening of the obstetric patient with chronic problems and to anticipate and provide the specialized care that she and her infant may demand. It is obvious that with this general improvement in the maternal mortality rate the chronic patient will contribute a greater percentage of the mortality of the future. In addition, many patients with other conditions such as infertility, premature labor, abortion, Rh sensitivity and certain gynecologic disorders related to pregnancy and those with possible labor dystocia should have available the benefits of specialized diagnostic and therapeutic aids to ensure the best in present-day medical care.

The Boston Lying-in Hospital has over the years developed special clinics devoted to these problems. Clinics are available for the supervision of the cardiac, diabetic; urologic and toxemic patient, as well as those with possible labor dystocia. Recent figures released by the Children's Bureau have shown that this hospital has developed a method of care that has produced the lowest mortality among premature infants of any large maternity hospital in the country. In this institution replacement transfusions for the treatment of infants with erythroblastosis was first carried out in New England.

Believing that the voluntary teaching hospital has an even greater future in aiding the distribution of medical care and knowledge, this institution has recently completed a successful campaign to obtain the funds necessary to create facilities for the provision of consultation services as well as additional space to be devoted for teaching and research. It is hoped that physicians throughout New England will utilize these consultation services for the benefit of their patients. It is believed that only in this manner can any teaching institution such as the Boston Lying-in Hospital fulfill its obligations to the medical welfare of the area that it serves.

JOSEPH VON MERING (1849–1949)

FEBRUARY 28 marked the hundredth birthday anniversary of Joseph von Mering. He belonged to that group of German clinicians who like Naunyn, F. von Müller and Minkowski were responsible to a high degree for the great progress in experimental pathology at the end of the nineteenth and the beginning of the twentieth century. He had an excellent medical education: Hoppe–Seyler introduced him to biochemistry; Ludwig was his teacher in physiology. He worked with Goltz on neurologic problems. He was Frerich's assistant in the medical clinic of the University of Berlin. Mering became privatdozent and assistant professor at Strassburg under Kussmaul and later director of the medical policlinic and medical clinic of the university in Halle. There he died in 1908. His knowledge of medicine was remarkable. He taught pharmacology, legal medicine, laryngology and internal medicine. Twice he was offered a chair in pharmacology and was also nominated by the faculty of the University of Vienna as successor of Stricker in the post of professor of experimental pathology.

Mering's scientific work includes three main spheres: the investigations on diabetes mellitus, the connection between chemical constitution and effect of hypnotic drugs and the conditions of absorption in the stomach. In 1886 he discovered the phlorhizin diabetes, and in 1889 he published with Minkowski the first paper on experimental pancreatic diabetes. His experimental work on the constitution and effect of narcotics started with studies on chloral hydrate and was crowned with the discovery of veronal, which he made when working with Emil Fischer. His investigations on the physiology of absorption from the intestine yielded fundamental knowledge about the absorption of water, sugar, dextrin and peptones from the stomach.

In his textbook of internal medicine, which he edited with Krehl, he tried for the first time to apply the principles of the great encyclopedic handbooks to a short textbook, and he did it successfully as the great number of editions of this textbook proves.

"EEG JOURNAL"

IN FEBRUARY of this year the medical journals of the world had the opportunity and the privilege of welcoming into their austere ranks the newest comer of them all — *Electroencephalography and Clinical Neurophysiology*. The official organ of the International Federation of EEG Societies, this quarterly international journal would represent almost the ultimate degree in specialization were it not for its broader scope. This breadth of interest allows it to include "any aspect of the physiology of the nervous system or neuromuscular system which may contribute to progress in our understanding of the neural basis of behaviour."

As stated at its masthead its purpose is threefold:

> . . . to provide an official organ for the various EEG Societies being established throughout the world, to bring together in one publication selected studies of merit in the growing field of neurophysiology as applied to the understanding of human behaviour, both normal and abnormal, and to foster international co-operation and understanding among scientists with these common interests.

Any newcomer to the journalistic field — as well as the old-timers — must see to it that the saddle girth is tightened and the stirrups adjusted, for there may be a rough ride ahead. "The EEG Journal," however, has been launched under good auspices and with excellent backing. The editor is Herbert H. Jasper, of Montreal, the co-editor, W. Grey Walter, of Bristol, England, and the managing editor, Robert S. Schwab, of Boston. The editorial board is representative of the civilized world. The publication office is in the charge of Dr. Schwab at the Massachusetts General Hospital.

The first number is concerned largely with a symposium on the physiologic basis of epileptic discharge delivered at the annual meeting of the American Electroencephalographic Society in June, 1948. May success crown its continuing efforts!

MASSACHUSETTS MEDICAL SOCIETY

DEATHS

COBB — Oliver W. Cobb, M.D., of Northampton, died on April 6. He was in his ninety-first year.

Dr. Cobb received his degree from University of Virginia Department of Medicine in 1897. He was a former president of Hampshire District Medical Society, councilor of the Massachusetts Medical Society and a member of the medical staff of Cooley-Dickinson Hospital. He was an affiliate fellow of the American Medical Association.

Two sons, five grandchildren and two great-grandchildren survive.

DRAKE — Richard A. Drake, M.D., of Marshfield, died on April 8. He was in his seventy-first year.

Dr. Drake received his degree from Harvard Medical School in 1902. He was a member of the staff of Lawrence Memorial Hospital and was formerly city physician in Medford.

His widow and three daughters survive.

ROE — John C. Roe, M.D., of Pittsfield, died on March 13. He was in his sixtieth year.

Dr. Roe received his degree from Georgetown University School of Medicine in 1915. He was chief of the surgical staff at Pittsfield Hospital and was formerly associate medical examiner of Berkshire District. He was a fellow of the American College of Surgeons and American Medical Association and was a member of the staffs of St. Luke's and Hillcrest hospitals in Pittsfield, Fairview Hospital in Great Barrington and W. B. Plunkett Memorial Hospital in Adams.

His widow, four sons and three daughters survive.

NEW HAMPSHIRE MEDICAL SOCIETY

DEATH

ADAMS — Charles W. Adams, M.D., of Franklin, died on March 12. He was in his eighty-sixth year.

Dr. Adams received his degree from Boston University School of Medicine in 1884. He was one of the founders of the Franklin Hospital and had served on the State Medical Board and Franklin Board of Health.

A son, two grandchildren and three great-grandchildren survive.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MARCH, 1949

RÉSUMÉ

DISEASE	MARCH 1949	MARCH 1948	SEVEN-YEAR MEDIAN
Chancroid	7	4	2*
Chicken pox	4026	2405	1793
Diphtheria	41	21	20
Dog bite	964	864	790
Dysentery, bacillary	4	9	9
German measles	892	119	316
Gonorrhea	274	215	327
Granuloma inguinale	0	0	0*
Lymphogranuloma venereum	3	1	2*
Malaria	0	7	8
Measles	6550	4205	3245
Meningitis, meningococcal	8	6	21
Meningitis, Pfeiffer-bacillus	0	4	4
Meningitis, pneumococcal	4	2	2
Meningitis, staphylococcal	0	0	0
Meningitis, streptococcal	0	1	1
Meningitis, undetermined	4	5	7
Mumps	1788	2522	1575
Poliomyelitis	0	0	2
Salmonellosis	2	4	8
Scarlet fever	1215	703	1457
Syphilis	218	226	443
Tuberculosis, pulmonary	180	227	230
Tuberculosis, other forms	12	25	20
Typhoid fever	0	1	1
Undulant fever	7	4	4
Whooping cough	319	241	645

*Five-year median.

COMMENT

Diseases above the seven-year median were chicken pox, diphtheria, German measles, measles, mumps and undulant fever.

Diseases below the seven-year median were bacillary dysentery, meningitis (all types), salmonellosis, scarlet fever and whooping cough.

For the sixth consecutive month chicken pox was at the highest level ever reported. German measles was at the highest it has been since the epidemic year 1943. The incidence of measles was the highest in March except for the record year 1934, when there were 9891 cases during the month. Only once since 1934 has diphtheria been higher for the month of March.

GEOGRAPHICAL DISTRIBUTION OF CERTAIN DISEASES

Anthrax was reported from: Newton, 1; Somerville, 1; total, 2.

Diphtheria was reported from: Billerica, 1; Boston, 23; Brookline, 1; Chelsea, 1; Danvers, 2; East Brookfield, 5; Everett, 1; Fall River, 1; Malden, 1; Newton, 1; Revere, 1; Rockport, 1; Somerville, 1; Spencer, 1; total, 41.

Dysentery, amebic, was reported from: Danvers, 1; total, 1.

Dysentery, bacillary, was reported from: Wrentham, 4; total, 4.

Encephalitis, infectious, was reported from: Brockton, 1; Quincy, 2; total, 3.

Infectious hepatitis was reported from: Boston, 2; Springfield, 1; Williamstown, 1; Worcester, 1; Wrentham, 3; total, 8.

Lymphocytic choriomeningitis was reported from: Cambridge, 1; total, 1.

Meningitis, meningococcal, was reported from: Cambridge, 2; Everett, 1; Fall River, 2; Hadley, 1; Lawrence, 1; Palmer, 1; total, 8.

Meningitis, pneumococcal, was reported from: Lawrence, 1; Quincy, 1; Salem, 1; Worcester, 1; total, 4.

Meningitis, undetermined, was reported from: Fall River, 1; Hanover, 1; Northbridge, 1; Randolph, 1; total, 4.

Salmonellosis was reported from: Wellesley, 2; total, 2.

Septic sore throat was reported from: Boston, 8; Lynn, 2; Swampscott, 1; Taunton, 1; Worcester, 8; total, 20.

Trichinosis was reported from: Boston, 3; Cambridge, 1; Quincy, 1; Westwood, 1; total, 6.

Undulant fever was reported from: Bridgewater, 1; Maynard, 1; Newton, 1; Pembroke, 1; Sandwich, 1; Swansea, 1; Wilmington, 1; total, 7.

MISCELLANY

WOMAN'S AUXILIARY, SUFFOLK DISTRICT

At its annual meeting on April 7, the Woman's Auxiliary of the Suffolk District Medical Society elected the following officers and committee chairmen for 1949-1950: president, Mrs. Joseph Garland; vice-president, Mrs. Roger I. Lee; secretary, Mrs. J. Martin Woodall; treasurer, Mrs. Charles G. Shedd; director for one year, Mrs. Harvey A. Kelly; director for two years, Mrs. Donald Munro; and director for three years, Mrs. Thomas H. Lanman. The chairmen of the various committees are Mrs. David J. Calicchio (membership), Mrs. Raymond A. Dillon (program), Mrs. Howard F. Root (legislation), Mrs. James P. O'Hare (health education), Mrs. Albert A. Hornor (public relations) and Mrs. Merrill C. Sosman (hospitality).

CORRESPONDENCE

CONSULTATIVE SERVICE IN OBSTETRICS

To the Editor: The following letter, which is being sent to the chief of staff of those community hospitals within a reasonable radius of Boston that have no formal obstetric service, is self-explanatory.

Dear Dr.——

It is the desire of the Boston Lying-in Hospital to increase its medical service to physicians and their obstetric patients throughout New England. This letter is concerned with the possible need for and the desirability of establishing free medical consultation service at the Boston Lying-in Hospital for the complicated obstetric case, should the attending physician so desire it. We are now

in the process of improving the hospital's facilities. Special attention is being given to the enlarging of the outpatient department. This will allow for more adequate housing of the cardiac, diabetic, urologic, toxemic, dystocia and Rh clinics, as well as many ancillary services. These clinics will be supervised by physicians who are eminent in their fields, and many are no doubt familiar to you. Naturally, since the hospital is a teaching institution, the resident staff will also be closely associated with the care of patients in these clinics.

To enhance the educational value of the institution to the community, we thought that members of your staff might be interested in the treatment of the complicated cases as they occur here at the hospital. It might be desirable to hold meetings from time to time at the hospital when certain obstetric topics would be discussed or a periodic review of the treatment of the complicated cases could be presented. We wish you would question your staff regarding the need for such consultation service and meetings. We would appreciate your opinion on these matters.

DUNCAN E. REID, M.D.
Obstetrician-in-Chief

Boston Lying-in Hospital

BOOK REVIEW

The Physicians of Essex County. By Russell L. Jackson. With a foreword by Harold Bowditch, M.D. 8°, cloth, 152 pp., with 12 illustrations and frontispiece. Salem, Massachusetts: The Essex Institute, 1948.

In the Essex Institute in Salem, Massachusetts, is a vast collection of material on doctors who were born in or who subsequently lived in Essex County. Much has found its way into print in the last eighty-four years in the Essex Institute Historical Collections, but a greater amount remains unpublished in papers, diaries and memoirs. The present director of the Institute has cast a wide net to catch the vital facts about the County physicians, many without medical degrees, others ministers of the Gospel, who practiced their art from the early seventeenth century to 1840. The list, a long one, has been carefully compiled, with appropriate references to sources of information. Most of the notices are short, — only a few lines, — but others of more famous personages comprise even a page or more. A few illustrations accompany the text, unfortunately without reference to their source. The brief biographic notes are listed alphabetically, but there is also an extensive index. Mr. Jackson has produced a sound, biographic study, gracefully acknowledged in the Introduction by Dr. Harold Bowditch, long a devoted student of medical history.

NOTICES

ANNOUNCEMENTS

Dr. Charles Djerf announces the opening of his office at 1200 Hancock Street, Quincy, for the practice of pediatrics.

Dr. Walter J. McDonough announces the opening of his office for the practice of diseases of the skin at 270 Commonwealth Avenue, Boston.

JOHN T. BOTTOMLEY MEDICAL SOCIETY

A meeting of the John T. Bottomley Medical Society will be held in the auditorium of the Carney Hospital on May 2 from 11:30 a.m. to 1:00 p.m. Dr. Herbert G. Finn will speak on the subject "Treatment of Cancer of the Skin." Drs. Morris Shapiro and Robert Grandfield will lead the discussion.

Physicians and medical students are cordially invited.

SUFFOLK DISTRICT MEDICAL SOCIETY

The annual meeting of the Suffolk District Medical Society will be held in Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, May 4, at 4:30 p.m.

There will be a meeting of the councilors of Suffolk District Medical Society on the same day and place at 3:30 p.m.

AGENDA

Call to order by the President.

Reports of committees.

Consideration of an annual assessment.

Unfinished business.

Blue Shield and Blue Cross Affairs.
Charles G. Hayden, M.D.

Report of Massachusetts Medical Society Affairs.
H. Quimby Gallupe, M.D.

Such other business as may properly be brought before the Society.

Adjournment.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children, will be held in the classroom of the Nurses' Residence on Thursday, May 5, at 7:15 p.m. Dr. Edward L. Young will speak on the subject "Liver Abscesses as Complication of Biliary Surgery." Dr. Gulli Lindh Muller will be chairman.

MASSACHUSETTS GENERAL HOSPITAL

A research meeting will be held in the Bigelow Amphitheater of the Massachusetts General Hospital on Friday, May 6, at 4 p.m.

PROGRAM

New Drugs in the Treatment of Parkinson's Disease. Dr. Robert Schwab.
The Pathologic Distribution of Water and Electrolytes in Patients after Duodenal Ulcer. Dr. Oliver Cope.

BOSTON UNIVERSITY SCHOOL OF MEDICINE ALUMNI ASSOCIATION

The seventy-fifth annual reunion of Boston University School of Medicine Alumni Association will be held in the auditorium of the School of Medicine, 80 East Concord Street, Boston, on Friday, May 6.

The morning session, which will be held from 10:30 a.m. to 12:30 p.m., will be as follows:

Some Problems Concerned with the Diagnosis and the Course of Prolonged Fever. Samuel Leard, M.D. (1942).
Pharmacologic Approach to the Treatment of Neurogenic Disorders. Frederick F. Yonkman, M.D. (1939).
Myelography — Indications and Significance. John D. Camp, M.D. (1922), assistant director, Section of Roentgenology, Mayo Clinic, Rochester, Minnesota.
Hormonal Alteration of Carcinoma of the Breast. Ira T. Nathanson, M.D.
Seminoma of the Testicle Followed by Adenocarcinoma of the Breast: Presentation of case. Frank E. Barton, M.D. (1924).

Luncheon will be served at 1:00 p.m. in the main dining room, eighth floor, Evans Memorial Building, 65 East Newton Street (price, 75 cents). Luncheon tickets will be available at the School of Medicine Auditorium.

The afternoon session, which will be held from 2 to 4 p.m., will be as follows:

Stump the Experts — Round-Table Discussion.
Moderator, Samuel Vose, M.D.

Chester S. Keefer, M.D. (Medicine).
Reginald H. Smithwick, M.D. (Surgery).
Leighton F. Johnson, M.D. (Otolaryngology).
William Malamud, M.D. (Psychiatry).
Joseph M. Foley, M.D. (Neurology).
Donald G. Anderson, M.D. (Education, American Medical Association).
Louis G. Howard, M.D. (Orthopedics).

Newer Antibiotic Agents, with Emphasis on Aureomycin and Chloromycetin. William Hewitt, M.D.
Pharmacologic Tests and Diagnosis of Tumor of the Adrenal Gland Causing Paroxysmal Hypertension. William E. R. Greer, M.D. (1943).

HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society will be held in the amphitheater of Building D, Harvard Medical School, on Tuesday, May 10, at 8:00 p.m. The following program will be presented by the Department of Pharmacology, Harvard Medical School:

Plasma Prostigmine Levels and Cholinesterase Inhibition in Dogs and Myasthenic Patients. Avram Goldstein.
Iodide Excretion in Dog and Man. Douglas S. Riggs and John B. Stanbury.
Effect of Cardiac Glycosides on Cardiac Tissue Metabolism. Albert Wollenberger.
Action of Pure Veratrum Alkaloids in Human Hypertension. Edward Meilman and Otto Krayer.
Antagonists to the Cardioaccelerator Action of Epinephrine. Otto Krayer.

NEW ENGLAND SOCIETY OF ANESTHESIOLOGISTS

A meeting of the New England Society of Anesthesiologists will be held in the auditorium of Building A, Boston University School of Medicine, 80 East Concord Street, Boston, on Tuesday, May 10, at 8 p.m. The scientific program will be as follows:

Heart Disease and Anesthesia. Dr. S. Gilman.
Subarachnoid Ephedrine. Drs. E. Marchand and S. Gilman.
Some Observations on Anesthesia in Uremia. Dr. A. Abrams.

Physicians and medical students are invited.

NORFOLK DISTRICT MEDICAL SOCIETY

The annual meeting of the Norfolk District Medical Society will be held at the Hotel Kenmore, Boston, on Wednesday, May 11.

PROGRAM

5:15 p.m. Business meeting. Embassy Room.
6:00 p.m. President's Reception. Social Hour.
7:00 p.m. Annual Dinner. Crystal Ball Room.
Acceptance Speech. W. Richard Ohler, M.D., incoming president.
Greetings from the Massachusetts Medical Society. Daniel B. Reardon, M.D., president.
Remarks on Woman's Auxiliary. Mrs. James J. Hepburn, president.
Erwin D. Canham, editor of the *Christian Science Monitor*, will speak on "The Role of the Press in the Present World Crisis."

SOUTH BOSTON MEDICAL SOCIETY

The annual dinner of the South Boston Medical Society will be held at the Harvard Club of Boston on Wednesday, May 11, at 6:30 p.m. The speaker will be Dr. Norman Welch.

HARVARD SCHOOL OF PUBLIC HEALTH

The Harvard School of Public Health announces that the Cutter Lecture on Preventive Medicine, initiated in 1912, will be held in Amphitheater D of the Harvard Medical School on Wednesday, May 11, 1949, at 5 p.m. Dr. James C. Spence, professor of child health, University of Durham, England, will speak on "Preventive Medicine: The role of parents in child health." The medical profession, medical and public-health students and others interested are cordially invited to attend.

MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

A meeting of the Massachusetts Society of Examining Physicians will be held at the Harvard Club, Boston, on Wednesday, May 11, at 7 p.m. Dr. Donald Munro will speak on the subject "Total Rehabilitation of the Paraplegic Patient," with a film presentation.

AMERICAN ORTHOPAEDIC ASSOCIATION

The sixty-second annual meeting of the American Orthopaedic Association will be held at the Broadmoor, Colorado Springs, Colorado, on May 18, 19, 20 and 21, under the presidency of Dr. Ralph K. Ghormley.

The orthopedic surgeons of Denver, with Drs. Robert G. Packard and Atha Thomas as chairmen, have planned a clinical day in Denver on May 17. All members of the Association and their guests are invited. Those planning to attend are requested to notify Dr. Packard or Dr. Thomas in advance, so that adequate arrangements may be made.

SAMUEL D. GROSS PRIZE

Essays will be received in competition for the Samuel D. Gross Prize of $1500 until January 1, 1950. The conditions annexed by the testator are the prize "shall be awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in Surgical Pathology or Surgical Practice founded upon original investigations, the candidates for the prize to be American citizens." It is expressly stipulated that the competitor who receives the prize shall publish his essay in book form, and that he shall deposit one copy of the work in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and that on the title page it shall be stated that to the essay was awarded the Samuel D. Gross Prize of the Philadelphia Academy of Surgery.

The essays, which must be written by a single author in the English language, should be sent to the Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Sur-

(*Notices concluded on page xiii*)

For abrasions, cuts, wounds and such uses,
The ancients had herbs and their juices.
Dr. Wise, in like need,
Just continues to read
The ads that he weekly peruses.

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